

# THE IRON AGE

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## Business Gets Back to Sound Basis

Industrial Effort More Effective When Not  
Diverted by Call Loan Profits and Merger  
Possibilities—Wages Must Be Maintained



James A. Farrell

By JAMES A. FARRELL\*

OF course, when we drive over a smooth piece of road, sooner or later we come to a place where we get a little bump. I think we place these obstacles in the road ourselves for the purpose of getting a little reaction occasionally. There is nothing the matter with the steel industry. I doubt if the real business situation was affected by the speculators and the people who were loaning millions on call at 10 or 15 per cent. Our business has a solid background. As Mr. Schwab has said, if you go over a period of time you will find, taking everything into account, that our business is good. Here and there, in some particular lines, business is not so good. I often think that perhaps here and there a little check on luxuries and other things that are not permanent is helpful.

### *Much Pipe Tonnage in Sight*

Take our business today—I can say that our business is very good. The production of most of the companies is up to 79 or 80 per cent—not down to 79 or 80 per cent, but up to 79 or 80 per cent. As I have said on other occasions, if we were to take our capacity

today and compare it with our capacity two or three years ago, we would all be running over 100 per cent.

There have been in the industry situations that sometimes occur over night. We have one at the moment. For a month or two the manufacturers of pipe have been wondering what they were going to do with their capacities and their plants. I think within 30 days every pipe manufacturer in the country will have his capacity filled until the early part of next year.

And then we go to the building business. What is the matter with the building business? Every fabricating plant in the country has got four or five months' work, but there is one feature of the fabricating situation which causes concern from time to time, and that is what is going to become of the small fabricator, who has been one of the greatest consumers in the past of iron and steel.

I am not going to make a speech this morning on the question of initiative or on the question of the elimination of small manufacturing companies; but this country was built up with small companies. We were all built up with small companies.

The corporation that I am connected with has a potential capacity today of 25,000,000 tons of steel.

\*President, United States Steel Corporation. Abstract of address before American Iron and Steel Institute, May 9.

When I came into the presidency 20 years ago we were making 7,000,000 tons of steel. And so it goes all through the industry. Everything runs big.

#### Smaller Manufacturer Ignored by Lenders

NOW the question in my mind is that perhaps things are going too big. You all know that a small manufacturer today is not received very enthusiastically in the banks if he wants to borrow \$15,000 or \$20,000 or \$25,000 to run his business. Some of the institutions are getting so large that they make inquiry when a small manufacturer comes in the door. He does not get to see the man that lends the money any more, because the man that lends the money now is interested in 10, 20 and 100 million dollar propositions and not in loans to back up the great potential power in the country which, after all, is the small consumer, who in the aggregate accounts for an immense tonnage.

We have got to give some thought to the recrudescence of the smaller manufacturer in this country, or we are all going to get so big that after a while there will be only half a dozen concerns or half a dozen utilities to do the business with each other. That is a phase of this question that might be given careful thought from the economic side of things.

When we were here a year ago a great many people were telling each other how much money they had out on call in Wall Street. John would say to me "We have got"—I am not going to say which John, but John would say he had 10 millions on call at 10 or 15 per cent; and I am not going to mention any more names, but another man would say, "Well, we have got 25 millions out on call." Everybody had money out on call. Where is it? It is not on call now; it is in plant and machinery.

#### Bloom Is Off Merger Rose

BUT that has not anything to do with the steel business, excepting that I think that we are now beginning—and it bears on this question of good management, Mr. President—to give our undivided attention to our business. For several months past people's minds have been on other things.

Once in a while I have been asked if I had any

hobbies. I read Shakespeare quite a good deal, and I was reading our old friend "Hamlet" the other night, and then I saw something that I immediately paraphrased in my mind, and it ran like this: "To merge, or not to merge; that is the question: whether it is better to be merged or to be submerged." And I finally came to the conclusion that the best thing we could all do in the steel industry would be to *emerge*.

I think the bloom is off the rose in the merger business. I think that if our friends in the steel business will attend to their own business they will make as much money out of what they have as they will out of what they expect to get or want to get. And I am here to say that I think that the time, the thought and the strategy that have been put in on the merger business have adversely affected the steel industry during the first quarter of this year. So I think that, if we settle down on a solid basis and

work out our navigation and know exactly what course we are pursuing, we can go ahead and sail the course and get back to normal business again—because there is enough business in this country for the steel industry to keep it going on a normal basis.

#### Wages Will Not Come Down

AND I want to mention another thing, and I do not wish to anticipate anything that the committee of which I am a member is going to report on to the Board of Directors, and that is the question of hours and the seven-day week—and another thing that our committee is not delegated to make inquiry about, and that is the question of wages.

We have had an experience in one locality where we know that, if the policy of the institute had been fully carried out, there would have been no unemployment in that place. Well, we can show a clean bill of health to a very large extent. I am not anticipating the combined report of the committee, and I have never made a minority report in my life on any question—that not only applies here but it applies in the company that employs me as president of its business. The companies or the individuals that operate plants, either wholly or partly 12 hours a day and wholly or partly seven days a week, ought to be made known

(Concluded on page 1501)

¶ We must give some thought to the recrudescence of the smaller manufacturer. This country was built up by small companies.

\* \* \*

¶ We are beginning to give our undivided attention to our business.

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¶ For several months past people's minds have been on other things.

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¶ The bloom is off the rose in the merger business.

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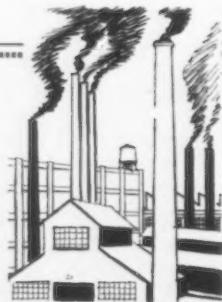
¶ Wages are not coming down.

\* \* \*

¶ We can compete in any market in the world except where there is an arbitrary tariff.

\* \* \*

¶ Short-sighted tariff tinkering encourages retaliation by other countries.



# Divers Heat-Treating Machines

**H** EAT treatment routine, as conducted in commercial organizations exclusively for jobbing work, is quite different from that to be found in subsidiary departments of large automobile factories, the topic of frequent articles on this subject. Commercial heat-treating plants have always faced the handicap of great diversification of operations, each batch of work having different specifications because every customer has his special requirements. This demands more furnaces than necessary for the same tonnage in the production shop. In the former, furnace conditions might be changed every hour, whereas the production shop may run furnaces 24 hr. a day on one class of work and be able to keep the furnaces loaded to capacity, all at one temperature and at one setting of pyrometer control or fuel system. It ceases to be a matter of skill in the production shop, while the commercial plant demands all skill and personal

## Commercial Plant Installs Furnaces for Metal Parts Ranging from a Small High-Speed Tap to a Welded Assemblage of Alloy Tubing for Aircraft

By FRED M. REITER\*



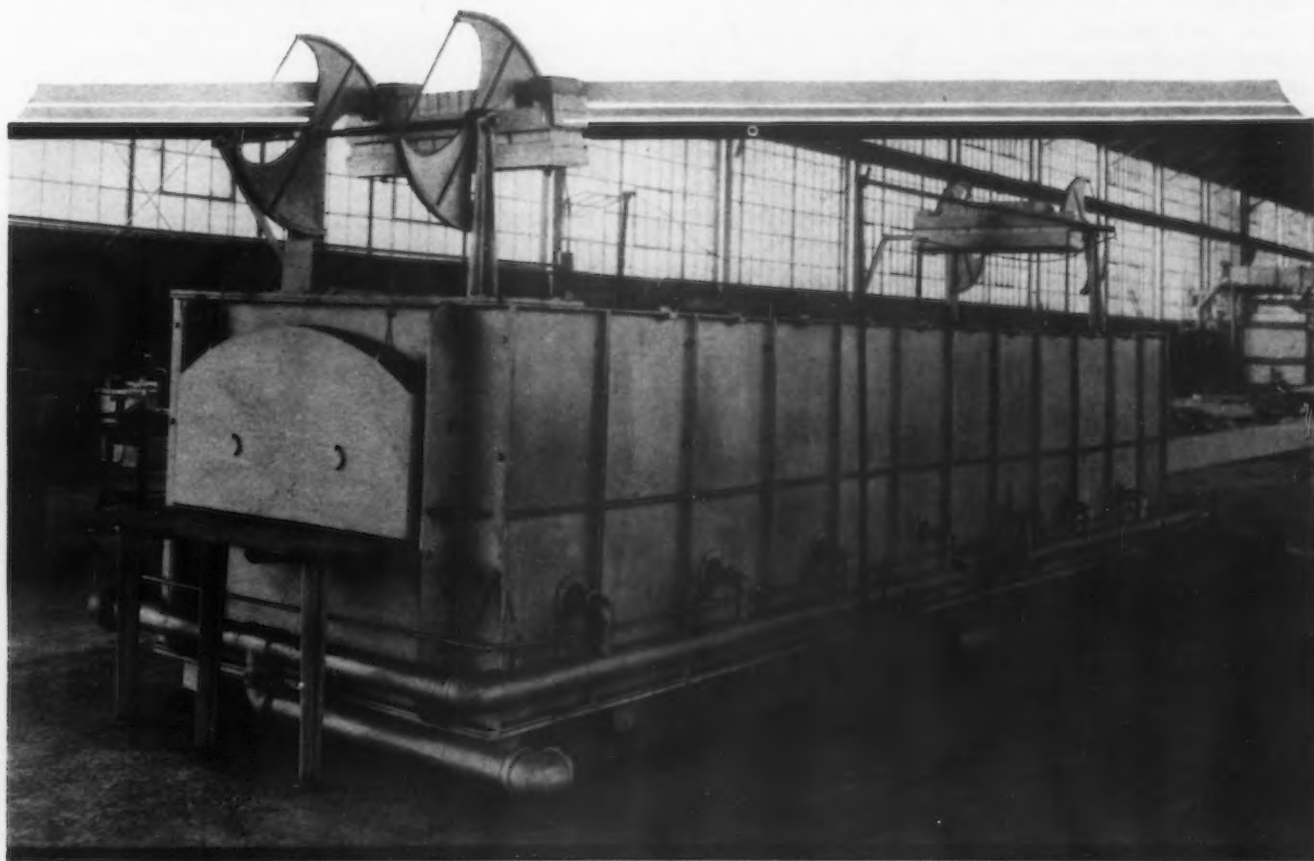
knowledge—so much so that automatic controls and new devices are frequently frowned upon as a reflection on the "art."

It has become apparent, however, that automatic control produces the most beneficial results on a furnace that must frequently be changed in temperature and operating conditions. All that is necessary is to merely move the dial indicator on the control instrument. To accomplish a similar result by hand regulation

of burners means many adjustments and close attention on the part of the operator for a considerable period of time. Any laxity results in poor work and accompanying loss in rejected product. When the time and effort involved in maintaining proper temperatures in a few furnaces through constant manipulation of fuel and air valves has been eliminated, a man can usually be released for other work, so that the control equipment pays for itself in a comparatively short time.

The question of recording instruments for commercial heat-treating plants has required some study. Some

\*Dayton Power & Light Co., Dayton, Ohio.



Double-Ended Furnace Has Burners Arranged in Two Banks. Automatic control may be set so entire hearth is at uniform temperature, or so one end is much cooler than the other for preheating on a through charge



have maintained that without careful routing of the separate pieces and a complicated marking of the chart and record cards, the latter lose any reference value when a number of pieces for different customers pass through the furnace at overlapping times. Too much depends on the conscientious performance of clerical work by the operator. However, when controversy arises between the maker of the piece and the commercial heat treater, the chart, backed by proper card records, becomes the referee. Where single pieces or groups are involved in each charge of the furnace, sections of the chart may be filed with the card, keeping the history of the part intact.

Dayton Forging & Heat Treating Co., of Dayton, Ohio, has adopted such a policy. When moving to new quarters, it was decided that complete automatic control should be installed and full records maintained. This has proved most economical and satisfactory. The investment in recording control equipment is expected to return many times the cost in years to come.

In removing to the new location, usable furnaces were reconditioned and obsolete equipment replaced. A systematic study of fuels—cost, controllability, handling and other advantages and disadvantages—was made. This resulted in the adoption of natural gas instead of the fuel oil formerly employed. Old style burner equipment (nozzle mixing oil burners firing through open ports with air infiltration) was replaced by a greater number of sealed tunnel gas burners. The latter were manifolded and supplied by means of air-gas proportional mixers with automatic gas governors requiring but one valve to control the temperature as well as the air and gas flow.

A number of gas jets along both sides of the furnaces simultaneously fed from one source give almost perfect uniformity of temperature even in a furnace 48 in. wide and 22 ft. long. Such a furnace shown in one of the views was especially designed for heat treating welded assemblages of

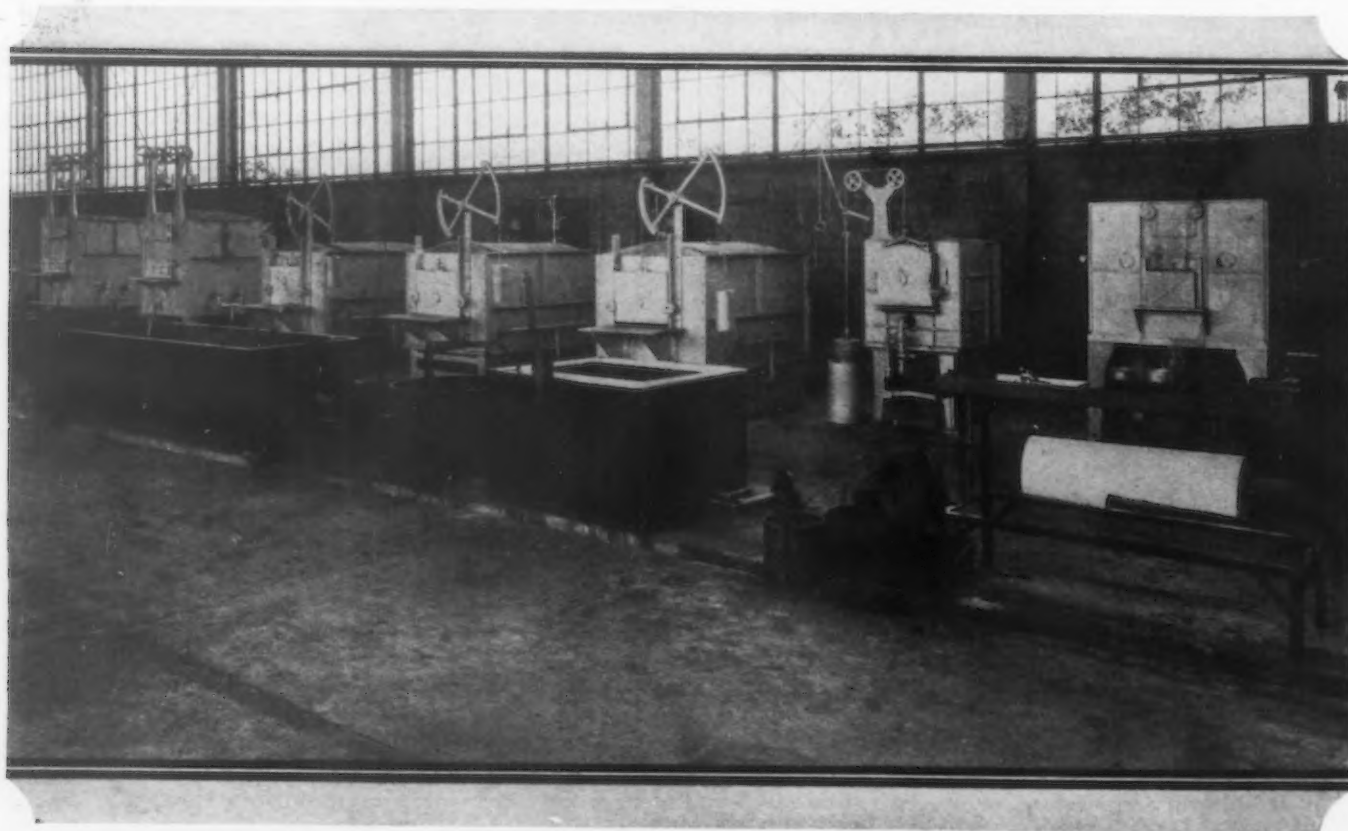
chrome-molybdenum airplane tubing, and landing gear axles for the Air Corps, United States Army, at Wright Field. Conditions for such work are especially exacting and require a high degree of uniformity of temperature throughout the long pieces of thin-wall alloy tubes. Test pieces are wired to the fuselage at intervals so that conditions in all parts of the furnace interior may be checked. These test pieces must show almost identical physical characteristics; as an example of the close tolerances permitted, every test piece, say for an 800 deg. Fahr. draw, must have an ultimate strength between 175,000 and 180,000 lb. per sq. in.

Heat-treated aircraft tubing must be scale free, so that the furnace atmosphere must be correct at all times. This is accomplished by means of automatic gas-air proportioning devices. The furnace is also designed for two-zone heating in other service, such as continuous straight through operations. Each 11-ft. zone is individually and automatically controlled in temperature and atmosphere.

The other hardening furnaces have been similarly designed and equipped. Three of the old furnaces were so enlarged in hearth area that the wall thickness was cut to the width of one brick, 4½ in., which would seem to eliminate all insulation, vital to economy and long furnace life. By using an expensive and special refractory brick a combination of heat resistance and insulation was secured in a 4½-in. wall almost equivalent to that of a 9-in. wall composed half of firebrick and half of insulation. Such thin-walled furnaces in operation are nearly as cool on the outside, and hold their heat in overnight shut-downs nearly as well as the more conventional types, and the investment in high priced refractory has more than paid for itself.

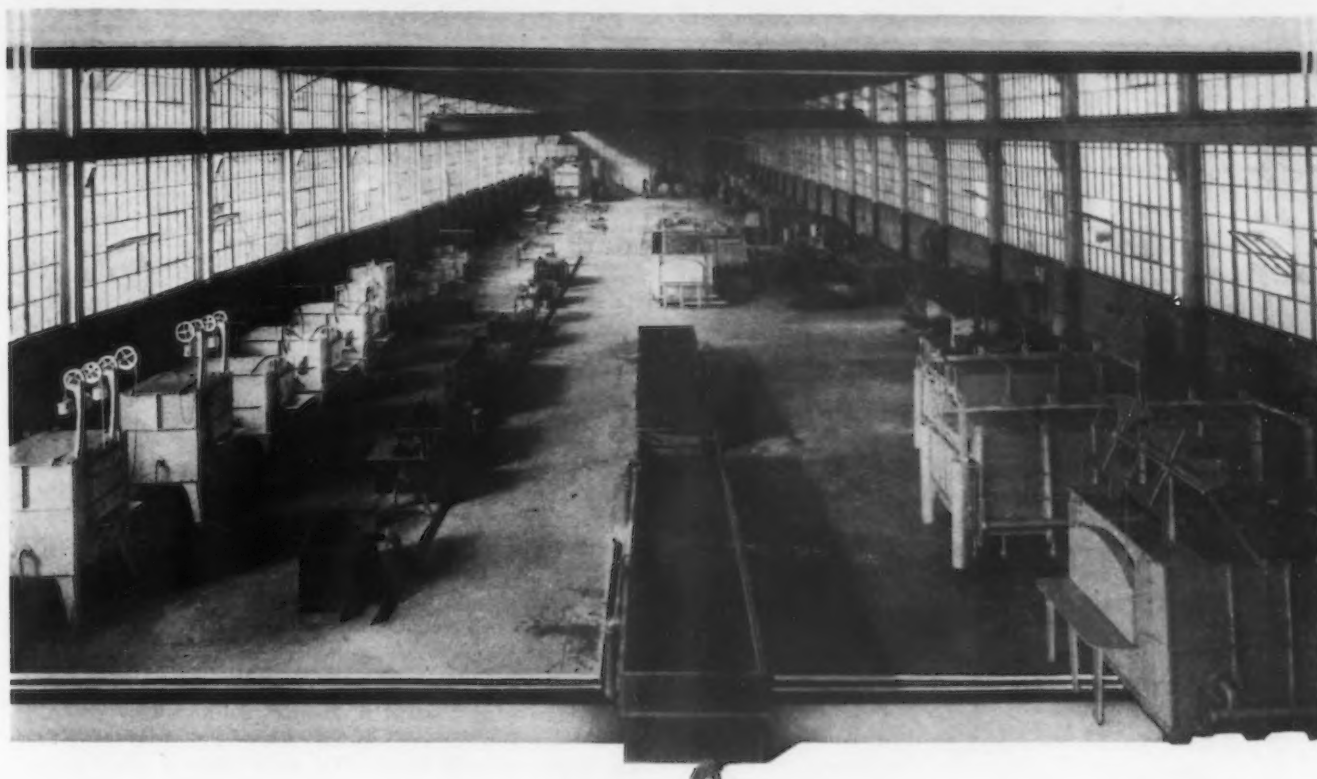
The same general design was applied to the pot furnaces, consisting of a number of lead, cyanide and salt baths shown at the left rear of the general view. Manifolded multiple tunneled burners were utilized, with gas and air pre-mixing, and

**B**ATTERY of Hardening Furnaces of Moderate Size. Quenching tanks (oil and water) and oil tempering equipment in the foreground



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**GENERAL View of Dayton Forging & Heat Treating Co. Plant designed to handle tools, machine parts, castings, and aircraft tubing**

these gave excellent results.

Longer carbonizing and hardening furnaces, varying from 10 to 14 ft. hearth, are notable for the uniformity with which the correct temperature can be held. Each of these furnaces requires about 1500 cu. ft. of gas per hour for the 2-hr. heating period, but after it has reached a temperature of 1700 deg. Fahr. requires but 300 cu. ft. per hour to hold the charge at this temperature. Correct insulation, multi-burner firing and proportional gas-air mixing, with automatic control throughout, was responsible for this economy in fuel and at the same time produces an excellent uniformity in temperature throughout the whole furnace chamber.

#### **Equipment Is Quite Diverse**

**F**ROM the following list it will be seen that the equipment installed by the Dayton company is capable of a great diversity of operations.

Two double deck hardening furnaces, each chamber 24 in. wide by 12 in. high by 36 in. deep, for hardening and tempering smaller parts at temperatures up to 1600 deg. Fahr. These are the left-hand pair of the small furnace group.

Three furnaces, 24 in. wide by 18 in. high by 60 in. long, for use up to 1850 deg. Fahr. One is equipped with a Carborundum hearth, for pack hardening of high-speed steel.

One preheating furnace for high-speed steel, 24 in. wide by 18 in. high by 24 in. long.

One hardening furnace for high-speed steel, 12 in. wide by 8 in. high by 18 in. long.

One furnace, 30 in. wide by 18 in. high by 120 in. long for general purposes.

One furnace, 30 in. wide by 18 in. high by 168 in. long for general purposes.

One carbonizing furnace, 48 in. wide by 24 in. high by 120 in. long. This and the above two are in the right foreground in the general view.

One furnace, 48 in. wide by 24 in. high by 22 ft. long, with two zone control; for aircraft and general hardening.

Pot furnaces, in line along the left-hand wall, as follows: Two cyanide pots, 18 in. diameter by 18 in. deep. One cyanide pot, 12 in. diameter by 10 in. deep. One salt bath, 18 in. diameter by 18 in. deep. One lead bath, 12 in. diameter by 10 in. deep.

Tank furnaces, toward the center of the building, as follows: Two oil tempering pots, 18 in. wide by 36 in. long by 18 in. deep. One oil tempering pot, 18 in. wide by 18 in. long by 18 in. deep.

Quenching tanks, in front of the furnaces, as follows: One oil tank is 48 in. wide by 22 ft. long by 36 in. deep. One water tank is 48 in. wide by 22 ft. long by 36 in. deep. Two water tanks are 36 in. wide by 8 ft. long by 36 in. deep. Two oil tanks are 36 in. wide by 8 ft. long by 36 in. deep.

In addition there are minor auxiliary quenching tanks,

as well as a complete oil cooling and recirculating system.

Furnaces are equipped with nine recording pyrometers operating Martin electric control valves in conjunction with proportional gas-air mixers and light signals. Pot furnaces are supplied with an indicating pyrometer with a switchboard for connection to hot ends in each pot. Oil tempering furnaces have their individual thermometers.

Combustion air is supplied by four Spencer turbo-compressors and two North American blowers arranged in dual piping for interchange when necessary. Gas is piped from a nearby high-pressure feeder line and reduced at the plant to normal operating pressures. All distribution piping is under floor or supported on the side walls out of sight.

#### **Causes of Blisters on Enameled Iron**

**R**ECENT investigations have been made at the Bureau of Standards on three samples of cast iron intended for enameling which gave serious trouble in regular production. Samples from one plant showed under the microscope a spongy texture in the iron immediately under the blister, a recognized mechanical cause of the defect.

A second plant was using a steel-iron mixture, melted in an electric furnace in such a way that the resulting castings contained only 1.2 per cent silicon, and showed a eutectic structure with an excessive amount of very finely divided graphite. It was believed that this carbon was readily oxidizable during firing into a gas which caused defects in the coating, and the trouble was corrected by reducing the amount of steel scrap and increasing the silicon content.

The third consignment of iron was normal chemically and sound when examined under the microscope. Nevertheless it possessed a certain surface condition which caused blistering when enameled under a variety of conditions. As discovered during an extended research recently completed at the Bureau of Standards, this was entirely cured by sand blasting and annealing the castings before starting the enameling operations.

# Bending Conditions of Galvanizing

## How to Produce Coatings of Good Bending Qualities— Avoiding Excessive Iron-Zinc Alloy Layer Is Essential

BY DR. ING. HEINZ BABLIK\*

**G**OOD bending qualities in a galvanizing coating are of much greater importance for the rust-proofing of zinc-coated iron (or steel) than is generally presumed. Especially for galvanized sheets and wires this quality is of the highest importance, because the former are bent when used for roofing, just as the wires are bent when used for telegraph lines and fencing.

If, due to the unavoidable bending, there should be a

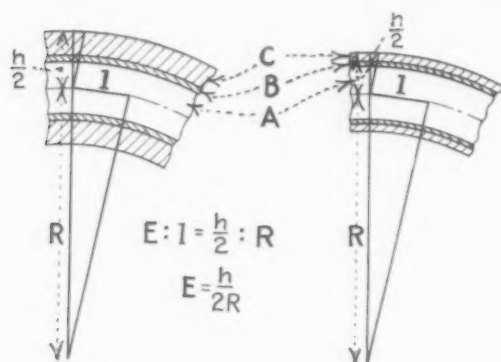


FIG. 1.—Showing the Elements in Bending Coated Sheets, A Being the Iron Base, B the Iron-Zinc Alloy Layer and C the Pure Zinc. E is the extent of lengthening, R is the bending radius and h is total thickness of the galvanized sheet

peeling off of the zinc coating, or cracks appear in it, the protection which such a broken coating offers to the iron below is very problematical. Results of experiments dealing with the question of the protection of zinc coatings on discontinuities in the coating have been published by a recognized authority on the subject.

So far as the experiments show, the zinc on very small discontinuities—for instance, zinc holes—can afford a protection when there is (as was the case in the experiments) an electrolyte of very good electric conductivity. These experiments show, however, that this protection is afforded in the main only when two conditions exist. The first is that the discontinuity is very small and the second that the zinc coating is thick. It must be thick because there is a considerable consumption of zinc in the process of this protection, and if the coating is only this much, that near the discontinuity is quickly eaten away and in a very short time there is no more anodic metal to protect the iron.

### Compact, Metallic Protection

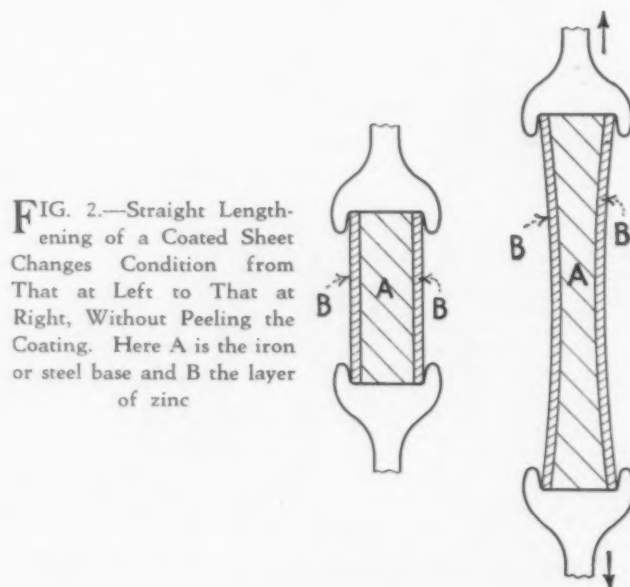
We must recognize the fact that rust protection can be given by zinc coatings only when a compact, metallic layer of pure zinc covers the iron base. What we have

to do is to replace the sensitive iron surface by one which is much more resistant to atmospheric attack. If the circumstances were in any way such that the electrochemical protection by the iron-zinc cell became effective, there would be no more protection to expect, because the existence of such a cell would cause the rapid destruction of the zinc coating.

In view of the foregoing, examination of the interesting experiments of Ulick R. Evans† shows unequivocally that if there is a thicker coating of zinc the specimen possibly begins to rust later. We must bear in mind that, however strong the attack of the experimental period was, it was of short duration in comparison with natural conditions, when even the thicker coatings would in time be eaten away under the influence of the electrochemical cell. The experimental attack lasted only 92 days, which period is not long enough for the zinc to be eaten away, as would be the case during a period of atmospheric attack.

Interesting experiments made by O. Bauer show that the protective operation becomes evident only if a current density of at least 0.0000106 amp. to the square centimeter (0.0000684 amp. to the sq. in.) on the surface of the iron is produced by this cell. Daily experience in inspecting cracked galvanized coatings shows that such protection practically never occurs.

A further fact in regard to zinc coatings is that in use they are to a much greater extent bent than the specimens in the experiments. The result of this treatment is that the discontinuities in practical conditions are greater than was the case in the experiments. It is therefore clear that a larger uncovered iron surface can no longer be protected by the zinc, except close to the border of the zinc covering.



\*Vienna, Austria.

†Journal of the Institute of Metals, 1928, part II, page 99.

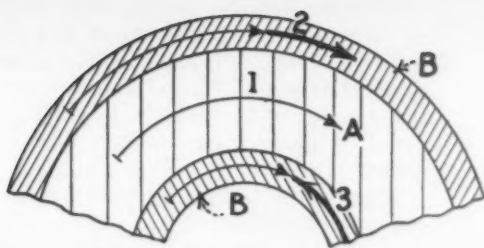


FIG. 3.—Unequal Lengthening of the Base and Coating, Caused by Bending, Leads to Peeling. A and B are the base metal and zinc coating; 1 is the lengthening of the neutral zone, 2 and 3 the differing lengthening of the two zinc layers

Nevertheless the fact must be again and again stated that, if the protection should be affected by the existence of the cell, the zinc would be eaten away too rapidly. If there is no defect in the zinc layer, a protective film of zinc salts is produced, and in this way the zinc is capable of withstanding the attack of the atmosphere for some time.

#### Coating Must Not Break Nor Peel

What is therefore imperatively demanded of a galvanized coating is that it should not break nor peel off under the bending conditions of use. The opinion largely held, dealing with this matter in the literature on the subject, still is that a thick coating cannot have good bending qualities, and that they can be obtained only by very thin coatings. The same opinion is expressed also in the standard A-93 of the American Society for Testing Materials. The classification is threefold: coatings of no bending qualities, of medium bending qualities and of good bending qualities.

In these classes the coatings are further divided according to the thickness of the iron base. The inference deducted from this is that coatings of good bending qualities are thinner than those of bad bending qualities. Further, we may note that if the coatings are to have good bending qualities they must correspond to some extent to the thickness of the iron base; in other words, the thinner the iron base, the thinner the zinc layer. The explanation of this fact I have found to be as follows:

In Fig. 1 are shown the conditions for a hot-galvanized coating when it is bent. There is a great difference in lengthening of the three layers of a hot-galvanized coating. Especially interesting is the lengthening of the

outer pure zinc layer, in view of the neutral zone of the iron base. From the calculation given, the lengthening of the pure zinc layer is dependent on the bending radius and on the thickness of the sheet. As the calculation shows that the lengthening  $\epsilon = \frac{h}{2R}$  it follows that the lengthening becomes greater as the sheet is thicker and the bending radius smaller.

Of course we can imagine that the danger of the peeling off of the coating increases with the increasing of the lengthening. It must also be stated here that numerous experiments have repeatedly established the fact that, by any lengthening of a galvanized sheet, the coating peels off only when the lengthening of iron base differs from that of the coating.

If the iron base and zinc coating are lengthened to an equal extent, there is no likelihood of the zinc coating

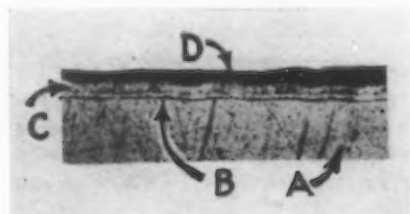


FIG. 5.—Four Layers of the Side of a Galvanized Sheet Are Shown Here, Magnified 50 Diameters. A is the base metal, B the difference of molten zinc into the iron, C a thicker layer of iron-zinc alloy and D the pure zinc coating

breaking before the iron base. A lengthening after the manner of Fig. 2 will therefore never result in coatings peeling off. In the case of bending, the lengthening of the iron base differs from that of the zinc coating, so that the two layers are stretched side by side and concurrently to different lengthening. The result is that they are forced apart, as shown in Fig. 3.

This explains the well-known fact that galvanized coatings when heated peel off. We must remember that there is a great difference between the expansion qualities of iron and zinc. Under ordinary conditions the expanding of zinc is nearly twice that of iron. Thus there is a difference in the lengthening of the two main layers, with

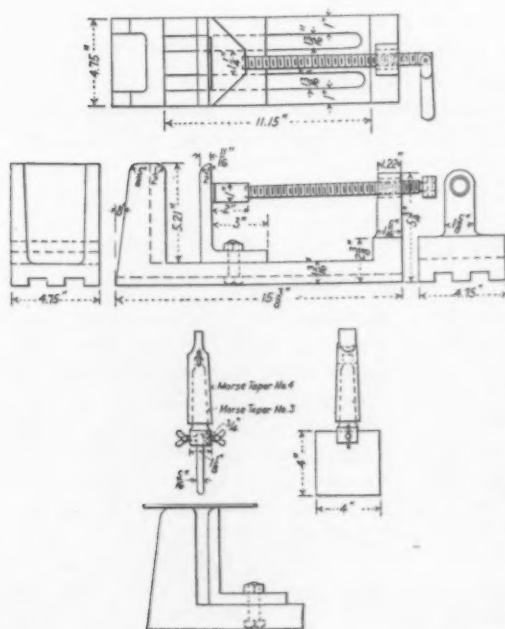
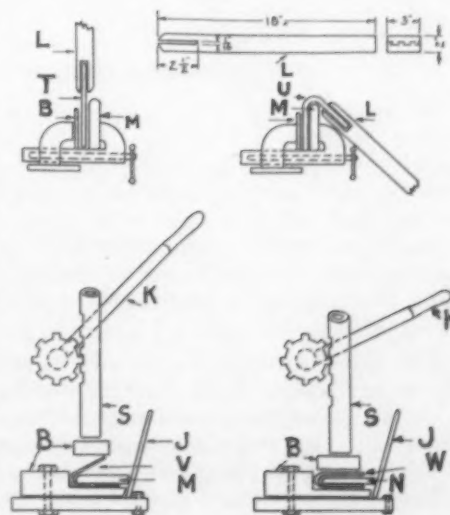


FIG. 4.—Laboratory Apparatus to Test Bending Quality. At left is the method used by Washington Navy Yard. At right is a different method, used by New York Navy Yard, United States Bureau of Standards and New Jersey Zinc Co. In the latter T is the test piece ready for bending; U, after bending to 135 deg.; V, ready for compression over 2-in. mandrel M; W, ready for 1.75-in. mandrel N; L the lever for first bend; K the operating lever for spindle S; J the lever used to hold the mandrel up to its work and B, blocks of wood or fiber





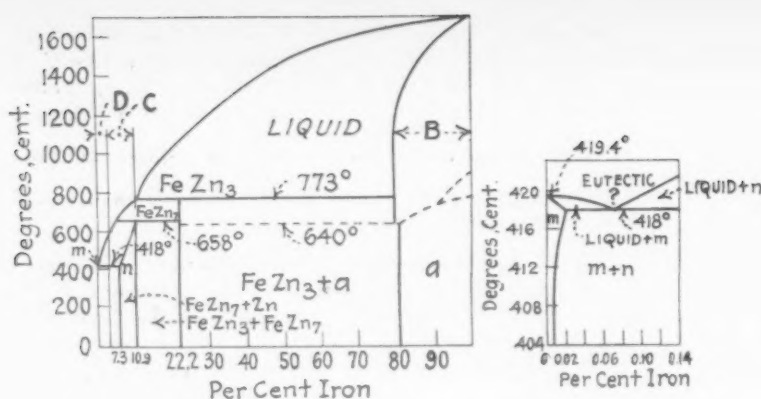


Fig. 6.—Layers of the Zinc Coating, Showing What They Are Composed of

the result of a separation and further the peeling off of the zinc coating.

#### Firm Adhesion of Zinc to Iron

To prevent the separation of the layers, various methods have been tried, similar to the one known under the name of "Galvannealing," with a view of producing a coating of good bending qualities by more securely fixing the zinc layers on the iron base. This is accomplished by placing a strong alloy between the zinc layer and the iron.

A very interesting paper was published a short time ago by H. A. Stacy (American Institute of Mining and Metallurgical Engineers, October meeting, preprint 1600C), which gives the results of many experiments made with a view of finding out a relation between coating thickness and bending qualities. In the main the conclusion arrived at, from this research work, is again that only thin coatings can have good bending qualities. Some of the results are given in Table I. It is to be noted, and this is also

Table I.—Results of Stacy Tests of Bending Qualities of Galvanized Sheets

(Sheets 1 x 2 m. or 39 x 79 in.)

Sheet Thickness mm.	Thickness of Coating, Grams	Multiples of Sheet Thickness to Which Zinc Coating Can Be Bent Without Breaking
1.6	743	4.2
1.6	1480	12.2
0.35	840	8.4
0.35	1320	10.4
0.35	1600	12.1

expressed by the standard of the A.S.T.M., that thinner coatings are better for bending than thick coatings, and that the thickness of the coating must be related to the thickness of the iron base.

#### Testing Bending Qualities

We will now deal with the question, how to test the bending qualities of a coating. In Fig. 4 is shown the apparatus used in the laboratories for the researches published by Mr. Stacy. It must be borne in mind that the bending qualities of a zinc-coated sheet cannot be expressed in the terms employed for an iron sheet. The bending qualities of the latter are measured by the number of times it can be bent backward and forward without breaking.

Zinc-coated sheets, however, must be tested in such a way as to determine the smallest bending radius over which the coated sheet can be bent without the coating peeling off. This radius can be expressed in multiples of the thickness of the sheets, or, better, in millimeters. This is the only correct method of testing the bending quality.

I have carefully considered the opinions cited above as to the relation between the thickness of the zinc coat-

ing and its bending quality. The first thing we must clearly understand is that the zinc coating of sheets consists of different layers—different as to both their chemical compositions and their physical qualities. As is shown in Fig. 5, in general a galvanized sheet consists of four layers.

First there is the iron base itself, and on it a very thin layer firmly fixed to the iron, produced by a diffusion of the molten zinc into the iron, and may consist of a solid solution of zinc in iron. On this layer comes a thicker one consisting of iron-zinc alloys of a composition approaching the compound  $\text{FeZn}_{13}$ . Further, on this layer, follows usually the thickest layer, of pure zinc. Fig. 6, the diagram of the iron-zinc alloys, shows the compositions of the different layers.

(To be concluded)

### Welded Construction on Recently Built Ships

A list of notable instances of recent welding in the shipbuilding industry, issued by the American Welding Society, includes the following:

Sister ships Pennsylvania, California and Virginia, built by Newport News Shipbuilding & Dry Dock Co., each utilized so much welding that 45,000 lb. of electrode was consumed on each hull. The same yard has two merchant ships now under construction wherein the inboard shaft alley bulkheads, bilge keels and masts will be completely welded. A 272-ft. yacht, Viking, utilized welding extensively, which is said to have assisted materially in obtaining the desired graceful lines.

The Fore River yard of the Bethlehem Shipbuilding Corporation delivered two colliers 350 ft. long with transverse seams of their tank tops welded and with bulkheads wherein two rows of rivets were replaced by one row and a continuous weld.

The Federal Shipbuilding & Drydock Co. of Kearny, N. J., has recently completed five all-welded channel type scows about 116 ft. long, 34 ft. wide and 10½ ft. deep, and is constructing two scows of similar type that are 175 ft. long.

The Truss-Weld Barge Corporation launched an 8000-barrel gasoline tank 134 ft. long. Also, the Electric Boat Co. has just completed a 1000-ton cargo deck barge, 118 x 10.5 ft. of all-welded design. In the construction of this barge some 150 tons of steel was used, and it required 18,000 ft. of welding and 3500 lb. of welding wire.

Lastly, there is now under construction at the Charleston Dry Dock & Machine Co. a completely welded 120-ft. oil tanker, and at the Standard Steel Shipbuilding Corporation, Los Angeles, Cal., a 65-ft. yacht.

### Five-Year Corrosion Test on Chromium Steel

EXAMINATION of samples of 13½ per cent chromium steel, which had been hardened, ground free from scale, polished, and exposed under various circumstances five years ago by the (British) Institution of Civil Engineers, shows that the bar which had been exposed to the atmosphere above high-water mark was in perfect condition, and that which had been submerged in fresh water was stained and slightly rusted but otherwise in perfect condition, and the part embedded in concrete was thoroughly preserved. The bars which had been in contact with sea water either continuously or intermittently had been severely attacked.

# Steel Plant Lubrication Problems

## Consideration of Methods Used and Difficulties Encountered—Anti-Friction Bearings Gaining in Favor

BY W. A. JAMES

**R**ELIABLE tests of a reversing mill engine have proved that about 30 per cent of its power is employed in the actual rolling process; about 27 per cent in overcoming friction of the engine parts; another 13 per cent in combating roll journal friction; and some 9 per cent in overcoming pinion and spindle friction. The remaining 21 per cent is used in producing acceleration of the parts in reversing.

As this analysis indicates, only 30 per cent of the total power shows up usefully in the product, while friction absorbs 49 per cent.

### Some Modern Methods of Lubrication

In some form or other, modern lubricating systems and methods are rapidly replacing older methods. One of the most outstanding of these is the so-called "circulating system." It includes a main supply line, with branches to the various elements to be lubricated, a common return line to take the individual returns from each element, a suitable tank for receiving and cooling the return oil and separating water and heavy impurities from it, and a means of cleaning and purifying the oil, as well as storage capacity for the clean oil.

One entire rolling mill is equipped with a "forced feed" system of lubrication. This reaches every individual bearing on motors, drive, roll housings, tables, manipulators and all auxiliaries. The oil is circulated, cooled and filtered. Its supply is so interlocked with main control that if the circulation should, for any reason, be interrupted the entire mill closes down. It is claimed that this system is so efficient that make-up oil amounts to only about 30c. a day, or what one oiler might easily waste in an hour.

This system eliminates the uncertainties attendant upon lubrication by the older methods. It insures the machinery being always ready to operate. This same mill, generously designed in all parts, although by no means

The accompanying article is an abstract of a paper read before the American Iron and Steel Institute at New York, May 9.

brand new in any respect, operated throughout 1928 with total delays chargeable to failures in equipment amounting to only 19 min.

### Roll-Neck Lubrication Bettered

A great improvement was introduced when babbitt metal was used in the construction of roll-neck bearings, giving alternate brass and babbitt areas. The result was to reduce the friction and make the lubricant more effective. This type of bearing is now being widely used in steel plants. The brass is usually an insert, held in position when the babbitt is poured around it. It is of particular importance, however, to have brass against the shoulder of the roll-necks to take the thrust.

Lubrication of vertical rolls has presented some special difficulties. This has been particularly true of their bottom bearings, since these were split open at the bottom, enabling the lubricant to run out. Use of a bushing type of bearing, closed at the bottom, now effectively prevents this. Grease, applied through a pressure fitting on the bottom end of the bearing, and able to work out of it only by passing upward between top flange of bearing and shoulder of roll, is now used as a lubricant.

This improved design both provides effective lubrication and keeps water and scale out of the bearing. Bearings so constructed run for months without being changed, in contrast with those of older design, which often have to be changed every few days. They offer the further advantage that wear of the top flange is almost negligible, with the result that their bevel gear teeth run on the proper pitch line and their life is prolonged.

### Special Problems of Certain Equipment

In many instances, such as on ore-unloading and reclaiming cranes or bridges, and on overhead cranes in the open-hearth department, this equipment must of necessity operate in an atmosphere containing a large amount of



**E**DUCATED in the public schools at Wilkes-Barre, Pa., where he was born, and graduated from Lehigh University in 1895 with the degree of B. S. in mechanical and mining engineering, W. A. James was for several years engaged in mining engineering. In 1900 he joined the Lackawanna Steel Co., then at Scranton, Pa., as a draftsman and in 1906 became chief engineer. When the Bethlehem Steel Co. took over the Lackawanna plant at Buffalo he continued as its chief engineer, which position he now holds. He has been identified with the construction and engineering progress of the Lackawanna plant since its beginning

dust of a more or less abrasive nature. It is of the utmost importance to take this factor into consideration when selecting the lubricant.

Anti-friction bearings of various types are finding an ever-increasing use in the steel industry. Practically all rolling stock, such as transfer scale cars, hot-metal and cinder cars in the blast furnace department, and charging box cars, ingot cars, etc., in the open-hearth department, are now equipped with this type of bearing, mounted in dust-proof housings. In addition, the table rollers in the most up-to-date blooming mills are now so equipped.

For lubricating this type of bearing a light No. 1 consistency low-lime-base grease has been found effective in warm weather, and a cold test grease in the winter.

Mill motors, generators, mill engines, blowing engines and steam turbines should also be lubricated by some automatic method. An automatic circulating system is an economical form of insurance against shutdown.

The correct lubricant must possess sufficient body to establish on the working surfaces of metals a film of enough strength to resist rupture from the pressures imposed. The most severe pressures occur on the engaging teeth of pinions, owing to the shock loads involved. The correct lubricant should also be adaptable for use in a "circulating system," where constant reuse of the same quantity of oil is entailed.

#### Cost of Lubrication

As regards lubrication costs, the following division is fairly representative in well-equipped steel plants:

	Per Cent
Rolling mills.....	51.5
Coke plants.....	9.5
Blast furnaces.....	15.5
Open-hearths.....	8.5
Steam, air and water.....	3.0
Miscellaneous.....	12.0
	100.0

As these percentages indicate, practically one-half of the lubricants consumed in a steel plant is consumed by the rolling mills. The cost of lubrication in this instance has been lowered by driving the rolls by motors in place

of steam engines. Such cost for fairly large blooming mills is 0.5c. to 0.6c. per ton of steel produced, when motor driven, and 0.8c. to 1c. per ton, when engine driven.

#### Discussion

One-quarter of the power now developed by motors or engines could be saved if the best anti-friction and roller bearings could be installed in rolling mills, in the opinion of B. S. Burrell, general master mechanic, Inland Steel Co., Indiana Harbor, Ind. In his experience, about half the repairs now made to rolling mills are directly or indirectly caused by inefficient or faulty journals. Conditions are much better now than five years ago, however, not only due to better bearings and better lubrication practice, but to better gears. At Indiana Harbor works, centralized stations for oiling and greasing cranes and roll trains have been successful and economical, and in connection with a wage incentive system have resulted in the following:

Savings in oil, 41 per cent.

Savings in repair and maintenance charges, 14 per cent.

Savings in bearings, 25 per cent.

Increased tonnage, 24 per cent.

D. L. Mekeel, Jones & Laughlin Steel Corporation, Pittsburgh, said that oils of unnecessarily high viscosity are often fed to journal bearings. Another general statement which might be made was that force-feed of oil is desirable. Special locations require the use of grease, such as roll necks where water from the rolls would tend to displace oil. Grease is also used in ball or roller bearings as a matter of convenience, and on many gears which, by virtue of combined rolling and sliding contact between teeth, require a lubricant of some "body." Mr. Mekeel emphasized the fact that journals must be properly designed and constructed if reasonable service is to be had—sharp corners on oil grooves are frequently left by ignorant workmen and careless supervisors, which are more efficient in wiping lubricant from surfaces than feeding it between them.



#### George M. Verity Makes a Talking Picture

THE American Rolling Mill Co., Middletown, Ohio, has adopted talking moving pictures as a means of supplementing special sales campaigns and of presenting facts about its business. George M. Verity, chairman of the company, is shown in the accompanying illustration at the Metropolitan studio at Hollywood, Cal., where he made a "talkie."



# Bulldog Slag as Related to Steel

**I**N discussing the acid or electrolytic theories of corrosion, their authors do not deal with the entire history. They fail to state at which step in the manufacture of iron and steel the injurious elements and their compounds enter the metal. The writer is of the opinion that the reduction zone in the blast furnace, relative to slag, should be considered the culprit. I say "relative to slag," because lately slag has been considered the cure-all of blast furnace ills.

Ninety-nine per cent of the slag, it may safely be said, will be used to flux the earthy materials out of the furnace. The 1 per cent is problematical.

Let us consider the elements and their compounds present in the burden. We know there are certain percentages of acid, earthy bases, metallic oxides, etc., with hard or soft coke for fuel, which will give certain reactions when fused in temperatures high enough to enable the fluid to be withdrawn from the furnace. The influence of the elements and their compounds in different temperatures should be thoroughly understood before starting to figure their proportion in the burden. The slag temperature, cause of its viscosity, is important. This indicates the ratio of bases to acid, or which temperature to use in a free-running slag.

## Wide Influence of Carbon Content

As an illustration: one of the elements is carbon; our finished product depends on the influence which the carbon has on oxides, silicates, sulphide, gases and mechanical properties. Once this influence is known, interreactions between elements and their compounds will be understood.

\*4110 Grand Boulevard, East Chicago, Ind.

## Tracing Defects and Corrosion Back to the Blast Furnace—Hot, Acid Slag Is Essential

By WILLIAM H. STEVENS\*



The strata of coke can be figured correctly to carry the contemplated burden through the combustion zones with the proper cubic feet of wind.

Correct filling of the furnace is absolutely necessary, for quality and quantity depend on it. Any deviation in filling will cause irregular travel, whether caused by wrong

weights, mix-up in stock, top of furnace out of level, throwing burden to one side, changing stock levels and other troubles, too numerous to mention here, but with which the experienced furnaceman is only too well acquainted.

Another practice now being tried is substituting a smaller bell, with the obvious result that the burden reaches the combustion zones in entirely different proportions. The standard bell distribution probably gives us a nearer ideal filling for American practice, and also brings the amount of wind required at the tuyeres.

Unless the weight, density and influence of the elements in the mix passing through the combustion zones are absolutely known, we are working in the dark, so to speak. Brassert, in discussing the combustibility of coke in 1914, stated that the early coke produced in our by-product ovens burns too slowly, thereby making furnace operations difficult, etc. Joseph, Kinney and Wood, in 1928, on the same question stated their belief that, although the tuyere action is important, it is more closely related to the density of the coke, the velocity of blast through the tuyeres, temperature, viscosity and relations of the slag in passing through the tuyere zone, than the combustibility of the coke.

Neither Brassert, Joseph, Kinney nor Wood offers any reason for the fact that some slags do not run freely at



**W**HEN steel is not up to sample, whose fault is it? Often the open-hearth man is blamed when the root of the trouble is much deeper. This presentation of the case ties responsibility, in no uncertain terms, to the character which blast furnace slags frequently assume. Suggestions for avoiding this condition give the article a constructive slant.



tuyere temperature. In my estimation the different writers should state that, if a cubic foot of wind is to burn a certain amount of carbon in the blast furnace, it will depend entirely on the density of the combustion zone. (A coke carrying a heavy burden is one side of the question, and a coke carrying a light one is the direct opposite.)

Every furnace operator tries to keep his combustion zone temperature many degrees higher than his slag temperature. The penalty for not doing so is obvious. Knowing the results, he takes a chance and changes his combustion zone temperature by putting on stone if his sulphur or silicon happens to go above the limit with a limy slag.

#### Governing the Soluble Silica

Now an experienced man, realizing the influence of certain elements and their compounds, would not put on the stone. He would make the necessary changes which govern soluble silica in the presence of lime and magnesia silicates, which are formed. Not only are silicates formed, but also an excess of lime and magnesia, in which case the solution will drop its silica. Just what becomes of the manganese which was in the solution when the stone comes down is debatable. Will it make the slag fluid?

It may be that the first stopping place of the silica will be in the combustion zones, where the obstruction shelf is formed. That holds up slag. To follow the change of stone through to the pig: the operator's cast will probably be lower in sulphur and silicon. In physical characteristics the pig will be scrappy, slow running, with graphite in evidence everywhere.

Graphite, as we know, retards fluidity. Certain weaknesses are also in evidence, large and porous grain structure, heavy cinder, and bulldog slag inclusions. This bulldog inclusion follows through to the steel. Its effect cannot be removed by any known process of refining.

#### Deoxidizing Agents Powerless

Effects of the gases which follow a limy furnace pig iron cannot be removed by any deoxidizing agents. It could be possible that the amoeba of corrosion gets its start from this type of pig iron. Upon tracing this type of iron back to the reduction zone in the blast furnace, it will be found that the only justifiable trait of a limy furnace is that it meets the chemical requirements, regardless of costs.

And further, on blowing up the furnace after the cast, the pressure generally goes higher; in a short while sloppy tuyeres will be noticed and the furnace will hang. It is perfectly natural to question the cause. The slag has changed its free running condition and viscosity shows up, plainly visible, by the resulting sloppy tuyeres. The tuyere temperature drops in front of these sloppy tuyeres in spite of a high blast heat.

At this time one might try to pierce the coke in front of these tuyeres with a pointed steel rod. This interesting experiment will enable one to understand the above statements.

#### Hot Blast Cannot Pierce Viscous Slag

The tuyere is surrounded by a viscous mass of acid slag, which the lime has dropped and which the furnace has built up, not only on the walls, but in front of the tuyeres. The chilling starts because the hot blast cannot penetrate this wall; neither can radiation travel fast enough for relief.

It is necessary to check the furnace, which results, usually, in cleaning the blowpipes. If escape from the sloppy tuyere condition is easy, it must still be remembered that the steel is almost sure to be contaminated by the bulldog, as the writer calls the slag in this instance, for it stays with the iron through to the finished product, as previously stated.

To go back to the proposed change in lime, the operator who understands the influence of the slag elements and their compounds may not have put on lime. He had other changes made which gave him a hot, acid slag, clean and fast running. The pig iron resulting from this cinder is entirely different. It is clean, free from scum, fast running, not scrappy, and has a low graphite content.

#### Pig Iron to Meet Both Chemical and Physical Needs

This iron not only meets the chemical requirements, but its physical requirements are as nearly perfect as possible, with an almost nil amount of gaseous and slag inclusions. The tuyere combustion zone temperature can be handled easier with a hot, acid slag. An absence of bulldog slag is practically assured. The obvious results are a smoother running furnace and increased production at lower cost.

Blast furnace men are held, at times, within narrow temperature limits to make a free-running slag. Present day pyrometers, commonly in use, are not proficient enough to record the temperature adequately. The technical man starting in this game could well learn how to judge these temperatures from the experienced furnace man. This same condition might also exist with reference to the slag. But he will take the lead, with his knowledge of physics plus geology and its history of silicates.

I do not in any way claim that the open-hearth department can be excused for making poor steel. But I firmly maintain that, if the pig iron used met with the bulldog slag in its downward travel in a globular state through the combustion zones, it will gather up more impurities than any known refining process in the open-hearth bath can remove.

#### Aluminum Alloys for High-Grade Motors

ALL aluminum parts of automobiles and aero engines made by Rolls Royce in England are of a new series of alloys developed in laboratories by Hall & Bradbury and patented under the family name "R. R. 50." Four grades are made, for general purpose sand castings, for forging, for die-cast pistons and for forged pistons. All fall within the chemical ranges:

	Per cent
Copper .....	0.5 to 5.0
Nickel .....	0.2 to 1.5
Magnesium .....	0.1 to 5.0
Iron .....	0.6 to 1.5
Titanium .....	Up to 0.5
Silicon .....	0.2 to 5.0
Aluminum .....	Remainder

According to a paper by W. C. Devereux, read before the (British) Institution of Production Engineers and reported in *Metal Industry*, sound, dense castings of R. R. 50 are as easily made as those of modified aluminum-silicon alloys, and, after a heat treatment at 175 deg. C. and suitable aging, are much superior in tensile properties and toughness.

Comparative figures for the various forging alloys were quoted as follows:

	Forging Temperatures		Heat Treatment	
	Maximum	Minimum	Quench	Age
Y alloy	500	350	520 in boiling water	2 hr. at 220
Duralumin	480	...	480 in water	7 to 14 days
R. R. 50	520	...	540 in water	20 hr. at 175

The Y alloy was acknowledged to be definitely superior for high-temperature service. Warping and cracking has always been one trouble associated with these high and long-continued heat treatments, especially at change in section. It has been avoided by immersing the cold castings in a crushed mixture of sodium and potassium nitrate (equal parts) and heating gradually until the salt melts and attains the desired soaking temperature.



# Steel Industry Needs Scientific Research

Science Has Lifted Steel Manufacture Far Above the Rule-of-Thumb Level,  
but Fundamental Research Is Necessary to Meet New Demands

BY ARTHUR D. LITTLE

**I**T must be obvious that, before you can utilize to full advantage a material exhibiting properties so diverse as iron possesses, you need a great store of exact and fundamental knowledge of the real nature of the material itself and not only of the conditions that change its properties, but also of the ultimate manner in which these changes are effected.

Having in mind the vast development of your industry and the imposing array of its varied products, I would not, myself, presume to say that you lack this essential knowledge, but shall quote those whom you regard as best informed.

Two years ago Dr. W. H. Hatfield said: "I am overwhelmed when I realize how much there is that we still do not know; when I realize how many of the simplest expedients in the industry are archaic, and how relatively backward is science in supplying the knowledge of natural law necessary for advancement; with many of the commonly accepted and so-called 'facts' which I really believe are not facts at all."

Sir Robert Hadfield says: "The science of metallurgy, notwithstanding the amount of research and investigation already accomplished, still presents in many directions a practically unexplored field for the investigator."

George L. Kelley says: "Theories of the hardening of

The accompanying article is an abstract of a paper read before the American Iron and Steel Institute at New York, May 9.

**A**FTER outlining the great advances made in the steel industry in the last century by the aid of the sciences of chemistry, metallography, electricity and mechanics, Doctor Little quotes several prominent metallurgists to the effect that our ignorance still exceeds our wisdom. He points out how scientific work is responsible for the various markets of this, the machine age, and that the steel industry must generously finance the fundamental investigations which will enable it to meet the demands of tomorrow.

metals are still in process of formulation."

Quotations of similar import could doubtless be multiplied many times. Those here are given with no thought of minimizing the brilliant and valuable results already achieved by the many gifted scientists by whom your problems have been studied. My purpose is solely to impress upon you that you have still very far to go before you can hope to have that complete mastery of your material which only the knowledge of its fundamental character can give you.

## Science, the Maker of Markets

Much as you may expect from the laboratory in the future, the present obligation of your industry to science extends far beyond its contributions to your methods of production and control. It has created all the major markets for your products. It is your most efficient salesman, and it works without salary or commission. Mathematics supplies the formulæ, and the testing laboratories supply the data without which there would be no great suspension and cantilever bridges, no steel-framed skyscrapers, no heavy guns and armored battleships, no huge ocean liners and no railroads as we know them now. The automobile is the product of science; science has immensely stimulated the petroleum industry, your manufacture of tin plate has reached its present great proportions only because the processes of the canning industry are super-

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**E**DUCATED at the Massachusetts Institute of Technology, Dr. Arthur D. Little has been actively connected with many important industrial developments, among which are new processes of paper making, artificial silk, chrome tanning, cellulose acetate, chlorate of potash, etc. He is a life member of the Corporation of the Massachusetts Institute of Technology, of the National Research Council, consultant for Chemical Warfare Service; president of Arthur D. Little, Inc., chemists and engineers, Cambridge, Mass., and director of Arthur D. Little Industrial Corporation of New York. He is a past-president of the American Chemical Society, American Institute of Chemical Engineers, and the Society of Chemical Industry (London). He is the author of "The Fifth Estate," "The Handwriting on the Wall," and numerous essays and addresses

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Arthur D. Little

*The Iron Age*, May 15, 1930—1459



vised and its product protected by the bacteriologist, and there would be no science of biology except for the optical physics which created the modern microscope.

Your good customers, the electrical industries, to whom you sell steel for huge power plants and generators, electric railroads, countless motors and transformers, and the towers of long transmission lines, trace their origin to the experiments of Faraday, in which, we may assume, the steel makers of 1831 saw little of significant importance.

The demands of the chemical engineer upon the steel maker are becoming increasingly rigid in their requirements, and they differ in many respects from those of the mechanical engineer. The very high pressures and temperatures involved in modern catalytic processes necessitate a high resistance to erosion, corrosion and gas penetration, in addition to the necessary strength under the severe conditions of the process.

Viewing your market in its broadest aspects, you are able to sell ten billion dollars' worth of product a year because we are living in the machine age, which is, itself, only an expression of modern science. The countless mechanisms which characterize our age, as definitely as Gothic cathedrals characterized another, are the creation of myriads of inventors. You are told that "necessity is the mother of invention," but inventions are conceived because research has supplied the facts of science, which are the fructifying influence.

#### Fundamental Research Is Worth Its High Cost

Many industrial developments today come far more commonly from organized research in which numerous highly trained individuals cooperate, and which is planned like a military campaign. It requires elaborate equipment, extensive library facilities, and, for its direction, intelligence and initiative of an exceptionally high order. It is necessarily expensive. Moreover, a successful research laboratory cannot be brought into being by the simple gesture of making an appropriation. The selection and welding together of an effective research organization is a slow process, and research results are the product of sustained and long continued effort. It is disastrous to involve the research laboratory in the daily recurring problems of plant operation and control, and to function successfully it must have the continuous sympathetic understanding and support of the executive officers of the corporation.

When wisely conceived, intelligently directed, and generously supported, research yields returns of an order of value out of all proportion to its cost. It becomes the mainspring of progress. If the steel industry as a whole were to devote to research one dollar in every thousand of its gross sales, the \$10,000,000 thus annually derived would still be much below the amount expended by one company in the single field of telephony.

Although the steel industry has long maintained a hundred or more metallurgical and control laboratories, it has for the most part depended for research upon such outside agencies as the Bureau of Mines, the Bureau of Standards, the Iron Alloys Committee of the Engineering Foundation, and individual workers in the universities and technical schools. With corrosion losses estimated at \$3,000,000,000 a year; with admitted ignorance of many of the factors fundamentally concerned with the operation of its processes and the quality of its products; with new and extraordinarily effective instruments and agencies for investigation ready to its hand; and with suggested possibilities hitherto undreamed of close ahead; it would seem that the time had arrived for the iron and steel industry to be definitely committed to a comprehensive, well-coordinated program of research upon a scale worthy of an industry which supplies the material basis of our civilization, and with which the prosperity of our country is so intimately bound. For, to quote Lord Melchett, whom many regard as the most far-seeing of British industrialists:

"Industrial research is one of the highways to prosperity; it may also be a short cut toward the same goal."

#### Discussion

THE paper by Dr. Little is an inspiration to industry, said Dr. George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass. The steel industry is so vast that certain lines of research are not fully appreciated, but rapid advances have been and are being made in tool steels, alloy steel and alloy cast iron, heat treatment and the physical metallurgy of steel. Several laboratories are working on these problems.

Excellent results have been achieved by scientific methods as applied by the Malleable Research Institute in the malleable industry. Due to the application of scientific discoveries, high-test gray iron has made rapid strides. Several other examples of a like nature could be cited. Much has been done in refractories and in the more expensive alloy steels. Progress has been made in fuels, and the high position of coke today is due to the iron and steel industry.

The main contribution of science to the steel industry has been the cultivation of scientific methods in laboratories and plants, and today technical men occupy many of the authoritative positions.

The importance of research cannot be over-emphasized. There is some truth in what Dr. Little says regarding the lack of it in the steel industry, commented Dr. Waterhouse. But a great deal of careful scientific work has been carried on and applied and much literature is being published as the result. Research in the steel industry is steadily advancing.



HERE is an illustration of the use of stainless steel in the jewelry field. The entire case and the face, numerals, hands and stem of the watch are of Nirosta, a high chrome nickel alloy steel, while the 17-jewel movement has plates of the same alloy. A brushed finish gives the case an appearance of platinum. The watch is manufactured by the Elhero Watch Co., near Berne, Switzerland, and retails for considerably less than a watch of similar movement in gold-filled cases. The Industrial Alloy Products Co., 230 Park Avenue, New York, is the distributor through licensees in the United States under the Krupp-Nirosta patents.

# Packing Products for Export

BY GEORGE S. HERRICK



**A**LTHOUGH export steel products travel farther as a rule and are often handled under less favorable conditions than domestic shipments, packing for export differs but little from domestic practice, except in the case of the more highly finished products, such as tin plate and sheets. A survey of various products shipped to foreign markets by American mills shows a decided trend toward simplification of packing in the past decade or more.

Export of sulphate of ammonia for one thing is of interest. American practice in the past has been to ship in new or used 200-lb. sugar bags, one inside the other to provide double protection, as the sulphate may sometimes burn through the fabric. This, of course, adds to the cost of an order, so that in the past month one export house in New York has made two shipments of about 500 tons each to Japan, handling the sulphate of ammonia in bulk. Based on the experience of European sellers, who have occasionally shipped in bulk, there will probably be a loss of about 1 per cent in weight, but the cost will not be greater than shipping in sugar bags.

## Small Sizes of Bars and Pipe Bundled

Small bars and pipe are bundled both for export and the domestic trade, most mills making it standard practice to bundle round, square and octagon bars up to, but not including,  $\frac{7}{8}$  in., and flats up to, but not including,  $1\frac{1}{2}$  x  $\frac{1}{2}$  in. Pipe is usually bundled in sizes up to and including  $1\frac{1}{2}$  or  $1\frac{3}{4}$  in. The bundling is done with heavy gage galvanized wire. On the heavier bundles, steel bands are sometimes used.

There is a slight departure from domestic practice in shipments of bands, No. 12 gage and thinner, which are shipped in lengths and often have the ends of the bundles covered with burlap fastened with heavy gage wire to prevent damage from bending. On bundles of the smaller sizes of bars, a burlap covering is often used on the ends, which might be badly twisted when bundles are handled into or out of the hold of a vessel.

## Tin Plate Specially Packed

The greatest difference in domestic and export packing appears in tin plate, a variation largely in shipments to the

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Variation From Domestic Pack-  
ing Chiefly In Tin Plate and  
Sheets—Trend Is Toward Simpli-  
fication and Lower Cost  
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Far East, Japan and China. In packing tin plate for delivery to the domestic trade, the usual practice is to use a flat box of thin, inexpensive wood with oiled paper occasionally placed on the top and bottom of the plate for protection against dampness. Such a box is too fragile, however, for export shipment, heavier and seasoned wood being used for the box and galvanized wire being bound around the case to prevent excessive wracking or possible breakage should the box be dropped during handling. This is always possible, especially as in certain foreign ports, all materials must be landed from ocean-going vessels by lighter.

Tin plate waste, substantial shipments of which are made to Far Eastern markets, is packed similarly to prime tin plate, but tin plate waste is usually shipped in unlined boxes with a net weight of 200 lb. in each box.

## Tin Lining Used for Export

As an additional protection, where the material is exposed for a long period to the corrosive effect of salt air, such as shipments to the Far East and South American ports, the boxes are usually lined. Formerly tin lining was almost exclusively used, especially for Far Eastern buyers, but occasionally oiled paper, top and bottom, would be requested as less expensive, the extra for tin lining being 18c. per box by Welsh mills and 25c. per box by American producers. Recently, certain American mills have reduced this extra to about 20c. per base box to bring it closer to the British charge. The tin lining is formed and soldered into a large envelope, from light gage tin plate, usually seconds, and the top can be closed and sealed with solder.

As many buyers do not like to pay this extra and yet want a reasonably safe protection against dampness on a long shipment, such as to the Far East, one large producer in the United States for some time has been making these envelopes of oiled paper, which resists dampness, although it lacks the strength of a tin plate envelope. The oiled paper, however, offers a considerable financial advantage, as the extra is only about 3c. per package.

At one time a mill in the United States developed a





sheet metal box, fabricated of black steel sheets, for export shipments of tin plate. It was formed over a wooden frame, and while designed to prevent breakage it was not watertight. Export buyers, however, have continued to show a slight preference for the wooden box despite higher cost. On short domestic shipments, one tin plate mill has used fiber board containers, as providing ample and less costly protection than a wooden box. For short export shipments, such as to Cuba or Mexico, tin lining is usually considered an unnecessary expense and oiled paper, top and bottom, is used for protection.

#### Less Packing on Export Sheets

Sheets for export are receiving less packing today than formerly. This applies especially to shipments going to China. In the past the Chinese, as a rule, specified delivery of sheets, usually galvanized, in wooden cases of 4½ cwt. (532 lb.) and 5 cwt. (560 lb.). Shipments were also made in wooden skeleton crates of the same weights, usually felt-lined to protect the edges of the sheets. Recently, however, merchants in China have found that the cost of these wooden cases, about \$9 per ton extra, is in excess of the probable damage to outside sheets on unprotected bundles, and many are specifying packages bound together with bands.

#### Black Sheets Shipped Unprotected

Black sheets are generally shipped without special protection, bound in bundles with bands, which pass completely across the bottom of the bundle and are pressed tightly over the edge at the top. Even the Nos. 30 and 31 gage black sheets, large tonnages of which were shipped to Japan until the Japanese recently became practically self-contained on black sheets, were shipped in bundles of this type, weighing 107 lb. or 112 lb., with 13 sheets to the bundle.

That further reductions in the cost of export packing

are receiving serious consideration by mills is evidenced by the fact that a mill exporting galvanized sheets has adopted cases fabricated from sheets with steel cleats across top and bottom of the crate. These have been successfully used for export packing and have met with the approval of buyers abroad because of the lower cost, about \$7 a ton of sheets, compared with a charge of \$9 a ton for wooden cases.

An American sheet mill shipping to a galvanizing plant in a South American market has found it desirable to pack the black sheets in bundles of about 1½ tons held together by clamps of steel bars and turnbuckles. Such heavy individual units are possible in this case only because material-handling equipment is available over the entire route from producing to consuming plant.

#### Domestic and Export Wire Packing Similar

Packing wire for export differs but little from domestic practice. Reels are covered with paper and burlap except in the case of galvanized wire, which is sometimes shipped unprotected. Whereas catch weights are usually shipped to domestic users, the reels varying in length according to the amount of wire drawn from a rod, the Chinese and Japanese formerly required reels of 112 lb. In this, as in other specifications, which in the past have been peculiar to the Far East, the trend is toward occidental standards.

Export packing of nails differs slightly, 50 or 100-lb. kegs of nails being shipped in the domestic market with ordinary wooden heads on the kegs, while export kegs of 100 lb. or more, the larger usually being piculs for the Far Eastern trade, have extra heavy hoops and steel cleats on both heads of the keg, as protection against rough handling.

The trend in export packing of steel products is decidedly toward simpler means of protection and less expensive materials for the purpose, which should contribute to lower c.i.f. costs for American steel products.

## With Gaggers Eliminated, Foundry Loss Greatly Reduced

DISCUSSING poor foundry engineering, Arthur J. Tuscany, manager, Gray Iron Institute, Inc., Cleveland, in a paper, "Important Developments in the Gray Iron Industry," delivered at the thirty-second annual meeting of the American Ceramic Society in Toronto, Canada, the week of Feb. 16, cited one or two important illustrations. He recounted the experience of a production executive in the manufacturing plant in one of the New England States, who made the following statement:

By studying the peculiarities of machine-rammed molds and then designing our flasks accordingly, we have been able to eliminate completely all gaggers from our production work. I will give an actual example. We received a job, patterns, flasks and machines, which had been running at an outside foundry for about two years, and is generally known as a bad job. The flasks were good cast iron flasks with machined joints and the customary number of bars. It required 78 gaggers and 42 20-penny spikes for each mold.

We designed a new flask which resulted in the elimination of all the gaggers and a reduction of the number of spikes and nails to eight for both the cope and drag. We were also able to discontinue tucking the bars. This made it possible for any laborer who can shovel sand to operate the machine and give us a perfect mold.

What was considered a bad proposition has become a

good job with a loss of under 10 per cent, instead of the previous loss of 40 to 60 per cent. This is the only job on which we are using nails, although our work is all of a more or less intricate and irregular shape, and our sand has to be kept fairly weak in order to run our thin section work.

#### Stretch of Steel Rods in Deep Wells

THE effect of oil field pumping operations upon the elastic properties of steel rods, when used in deep oil well pumping, have recently been investigated by H. E. Dralle, petroleum engineer, and M. Stone, research engineer of the Westinghouse Electric & Mfg. Co., East Pittsburgh. The investigation revealed that when steel rods, each about 20 ft. long, are screwed together and lowered into a well supporting at the lower end a pump which moves up and down from 6 to 30 times a minute, to bring oil to the surface, each rod stretches a little because of the starting, stopping, raising and lowering of the string of rods, and the long column of oil.

The top rod stretches the most because it supports the total weight, and the bottom rod stretches the least. The slight stretching in each 20-ft. length added together makes up a total of 1 ft. or more.



# Industrial Outlook Is Satisfactory

Addresses of Messrs. Schwab  
and Farrell Before Steel Men  
Are Reassuring—



Institute President Is Gary  
Medalist—Conflicting Views  
on Mergers

**R**EASSURING views on the business outlook were expressed at the thirty-seventh general meeting of the American Iron and Steel Institute, held at Hotel Commodore, New York, May 9. Charles M. Schwab, president, predicted improvement in business as the year progresses and a last half "at very satisfactory levels." James A. Farrell, president of the United States Steel Corporation, declared that steel business is already at a good level, with ingot output equal to what would have been 100 per cent of capacity two or three years ago. He predicted that within 30 days steel pipe makers would be booked to capacity for the rest of the year.

President Schwab attributed the "remarkable stamina" of the steel industry "in shaking off the effects of one of the worst crises in American business history" to superior management—improvement in organization and equipment, diversification of product, stronger financial structure and the consolidation of complementary plants. Mr. Farrell concurred in President Schwab's remarks except on the subject of consolidation, declaring that the "bloom is off the rose" in the merger movement and that it is time for everyone to give undivided attention to his own business.

Answering Mr. Farrell with the rare humor for which he is noted, Mr. Schwab pointed out that his own situation was different from that of the Steel Corporation head, since "Mr. Farrell can't merge any more." "When he (Mr. Farrell) was speaking about mergers," said President Schwab, "I was reminded of a friend over at Johnstown, Mr. Du Pont, who married a widow with six children, and he had six children himself. My brother, Ed, has a family of eight daughters. Mr. Du Pont said he had 12 children; Ed said, 'That is right, but you got yours by merger.'"

"Some of these mergers, we hope, will turn out to the benefit of the whole industry and for the good of everybody concerned," added Mr. Schwab.

The president's gift for story-telling also came into play during the extemporaneous remarks that prefaced his main address.

Good management, he explained, was not any abnormal thing; it did not preclude competition. He recalled an incident on his farm when the "plowman was standing by the plow, and I was standing by the plowman, and a great bottle fly came along and settled on the flank of the horse. He (the plowman) took his hat and was just about

to kill it, when I said: 'Don't kill that fly. That is what makes the horse go.'

"These little competitive things that we have are what make the steel industry; they are the bottle flies of the industry. They must continue."

## Gary Medal to President Schwab

At the banquet in the evening 1675 were present. The feature of the after-dinner program was the presentation by Mr. Farrell of the Gary memorial medal, the most distinguished honor that can be bestowed on anyone in the iron and steel industry, to President Schwab. This ceremony, marking the second award of the medal—the first having been made last year to Mr. Farrell—was followed by a storm of applause, evidencing the high esteem in which the medalist is held.

The invited speakers of the evening were Dr. Michael I. Pupin, professor emeritus of Columbia University, and Dr. Edward J. Cattell, city statistician, Philadelphia. Dr. Pupin vigorously refuted the claim of some European writers that every machine civilization, no matter whether controlled by militarism or not, is a sordid materialism. Europe, he said, sees only our creation of material wealth. What it doesn't see is our cultivation of the highest intellectual and spiritual values of the human soul.

Dr. Cattell was introduced by President Schwab as the "youngest old man I know." His remarks, although interspersed with seemingly casual witty passages, had a sustained motif of optimism. "The dominant note of this century," he declared, "is that men are moved by lure and not by the lash."

## New Directors Elected

At a meeting of the directors of the institute the resignations of John A. Topping and George M. Laughlin, Jr., Jones & Laughlin Steel Corporation, were accepted, and Tom M. Girdler, chairman-president, Republic Steel Corporation, and George G. Crawford, president, Jones & Laughlin Steel Corporation, were elected to the board. John A. Topping and Thomas Cantley, Nova Scotia Steel & Coal Co., Ltd., were elected honorary vice-presidents. The outgoing officers, with the exception of Mr. Topping, were reelected and the same standing committees were also reelected, except that Willis L. King retired as a member of the committee on welfare work.

Abstracts of the papers and discussions at the tech-



nical sessions are published elsewhere in this issue or will appear in subsequent issues.

President Schwab's address, in part, follows:

#### *President Schwab's Address*

**A**MERICAN industry has been passing, and indeed is still passing, through a period of severe test. It shows every sign of emerging with flying colors. So far as the steel industry is concerned, the test has been met with conspicuous success. No industry in the country has more ably met the difficulties resulting from the greatest stock market collapse in history. The recovery made by the steel industry since the beginning of the year has surprised many people, including some of the most astute economists in the country. For this happy result no single factor is more responsible, in my judgment, than the resourceful, far-sighted management which directs the affairs of this industry and has brought it to its present commanding position in American life.

#### *Great Advances in Equipment and Organization*

**I**N respect of both equipment and organization the American steel industry is today in a sounder condition than ever. Extensive rehabilitation programs have effected great improvements in plants, with consequent remarkable economies in the cost of operation. There has been progressive improvement in internal organization within individual units and, in addition, consolidation and mergers have placed the industry as a whole upon a more stable basis.

The beneficial effects of these developments have been seen in the firm and even manner in which the industry has passed through periodical declines in production without anything approaching distress, with very little unemployment and with virtual price stability. Years ago, before the industry had been brought to its present high level of organization, conditions similar to those which nowadays are weathered without perceptible disturbance

would have entailed shutdowns, general depressions and widespread unemployment for a prolonged period.

In the remarkable advance made since those days in correcting deficiencies in organization and preventing the inevitable consequences which flowed from them there has been no greater factor than the very high order of managerial skill which is as much interested in new ideas, new products and new ways of doing things as it is in turning out traditional products with greater efficiency and economy.

Moreover, the advance of which I speak has not been confined to operations or to the commercial side of our business. It extends through every phase of it and is notably reflected in the industry's position in the financial world. In fact, there has come about as a direct result of better organization in the steel industry a much stronger and firmer financial structure.

#### *Bigness Not a Vice*

**I**T is natural to the course of economic progress that larger enterprises should develop from smaller ones, and this tendency, involving mergers and consolidations of units that are complementary, has generally been and promises to be in the future of benefit alike to industry and to the public.

The tendency toward larger organization must justify itself in each specific instance. Where it demonstrably results in better diversification, greater industrial stability and efficiency, and gives to the public greater or better facilities for supplying its needs, there it is legitimate and will succeed. And in such instances it deserves the fullest public encouragement.

While bigness is not in itself a virtue, it is not, on the other hand, a vice. To discourage expansion simply because it is expansion is illogical and contrary to the public interest, since the effect would be simply to place artificial barriers in the way of natural economic progress from which, in the long run, the whole community will

#### *Second Quarter Will Be Better Than First—President Schwab*

**A**S to general business, from all present indications the second quarter will be better than the first, with prospects good for a substantial volume of business in the second half of this year. The consensus of opinion is that, with the present ease in money, new life will come into business as the year progresses. In fact, in many quarters, there are signs that business in the latter half of this year will be at very satisfactory levels.

**I**NDUSTRIAL production is once more on an upward trend; employment, which happily was less seriously affected this time than in any business crisis in the past, is showing noticeable improvement. Automobile production is picking up. Building construction is showing improvement, and present signs point to a continued increase in this fundamental activity. Shipbuilding, which has been at a low ebb for several years, has made a substantial recovery. The various public works and road construction programs, undertaken by Federal, State and local authorities as a result of the courageous leadership

given by President Hoover, undoubtedly will have stimulating effect, although this will take time to make itself generally felt. Speeding up of public improvements will be helpful, but far-sighted industrial management recognizes that in the long run industry must, of course, rely for its recovery upon normal conditions, not on outside aid.

**A**LL present indications are that 1930, in a broad perspective, will prove a year of normal business progress. As a matter of fact, business is a lot healthier today than it was six or nine months ago because of the inevitable house-cleaning which has taken place. We cannot expect record years all the time. We should realize that comparisons for the purpose of gaging our present progress should be made with normal years, rather than with what was an abnormally good year last year. All in all, I believe the record of 1930 will compare most favorably, from a business standpoint, with recent normal good business years.



benefit. Here again management plays a dominant part, for the value or the danger of corporate growth from the standpoint of the public welfare will depend upon the character of the people—the management—who control its policies and operations.

#### Must Develop New Uses for Steel

**G**OOD management has also seen to it that the prosperity of the steel companies rests on a broad basis of activity in many lines. Diversification of products has effected greater stability in both production and employment. While the railroad, building and automobile industries remain our biggest customers, at least 40 per cent of the 1930 consumption of steel, it is estimated, will be in other fields. The demand for large quantities of alloy steel, a comparatively recent development, also promises to increase in importance.

New uses for steel are constantly being found and undoubtedly large unexplored fields for development lie ahead. Current expansion programs are likely to increase the plant capacity of the industry by about 7 per cent this year. Tonnage for this increased capacity should not be expected to come entirely from existing sources. An important part of it should be found by extending the use of steel into new fields.

Increase in the use of steel has been accompanied by decreasing prices to consumers, greater volume, better operating efficiency and more stable earnings. It is good business to share with consumers the results of greater efficiency and this process can continue indefinitely as long as prices and profits bear a fair relationship to each other and to the needs of business to expand and keep pace with the country's growth.

Good business recognizes that one group cannot long prosper at the expense of another and that the greatest good to the public, as well as to the industry, results from an even balance between reasonable prices and reasonable profits.

During my half-century connection with the steel industry I am happy to say that in all the keen competition that has existed, and must necessarily exist, there have always prevailed wholesome relations among the individuals and the groups within the industry. There never has been and there is not today any place in the steel industry for internal divisions.

#### Outlook for Future Reassuring

**I** HAVE never known a time when steel management had equipped itself so well to gage accurately and with sound judgment the factors that it should take into account in charting its progressive course. Accordingly, after weighing all factors, I am sure I voice the opinions of steel men generally when I say that, looking ahead, the prospects for the future of the steel industry are reassuring.

Now then, with respect to immediate prospects in our industry, following last year's record output, the rate and trend of operations since Jan. 1 this year have been much better than was generally anticipated. On the whole, the advance in the early part of this year was greater than seasonal. The steel industry experienced practical immunity from any serious effects resulting from temporary fluctuations in general business activity. Moreover, the industry occupies a unique position in respect of the long-term, continuing character of its principal customers, the automobile, railroad, public utility and building industries. In addition, due to the ingenuity and resourceful character of those who are managing it, there is accumulating evidence of steel's expanding usefulness. Even the progress of other so-called competing metals and materials actually results in increasing, rather than decreasing, the demand for steel.

Therefore—and this is one of the favorable factors underlying the whole steel situation—prices today and for more than a year past have been prices on which we could firmly stand our ground. Notwithstanding the last year's record output and demand, no price inflation occurred, and we have, therefore, no reason to expect prices to fluctuate downward simply because our rate of operations happens to be less than it was a year ago.

#### Traditions Not Restrictive

**T**HE steel industry has its traditions, but these traditions are not restrictive. Now the outstanding tradition of the American steel industry is constant improvement, a tradition of alert responsiveness to changing conditions, resourcefulness, far-sighted vision and courage to explore new ways in a spirit which finds change a stimulating challenge rather than an obstacle to progress.

And so, my friends, permit me to draw upon 50 years of happy association in steel to say that by continuing in increasing measure to carry on our heritage of good management; to protect our workers, our stockholders and the public, the greater will be our contribution to the industry we serve and to the nation.

\* \* \*

#### Citation on Certificate of Award

**T**HE certificate of award presented to Mr. Schwab with the Gary medal contained the following citation:

*"For technical and executive ability, coupled with far-seeing vision in making Carnegie Steel Co. an important steel producing organization, only to cause it to be united with others to form the greatest steel producer in the world—for organizing and directing the early work of that great company—for bringing another concern of small output and specializing in ordnance and machinery to a position second only to the largest producer—for most outstanding patriotic service to the allied nations and to our own Government during the World War—because he has the respect and admiration and best of all is loved alike by his associates and his competitors—and for unselfish public service over many years and in many ways."*



**CHARLES M. SCHWAB**  
Was Awarded the Gary  
Memorial Medal, Being the  
Second to Be So Honored  
by the Institute



# X-Rays Control Production

Successful Concrete Cases—  
X-Rays Aid in Heat Treatment—Applications of  
Fluoroscopic and Diffraction  
Methods

BY WILBUR S. WERNER\*

**F**OUNDRIES at present equipped with X-ray machines secure higher prices for their castings on account of the better values given. Also, discriminating purchasers are now specifying X-ray tested castings, either "pilot tested" or "individually tested" as the need may be.

The present limiting thicknesses of the common metals commercially tested are: 3½ in. of iron, 2½ in. of brass or copper, 8 or 10 in. of aluminum, or the equivalent in any other metal. The steel alloys offer individual problems depending upon their composition.

## Welds Profitably X-Rayed

By no means the least important use of X-rays is in the inspection of welds. Modern welding practice is very dependable; so much so, in fact, that welded parts are used in many places where a breakdown would mean a disaster. This has called for more rigid methods of inspection. The use of X-ray inspection is one of the most modern ways of assuring a weld that will stay intact.

Radiographs of defective welds are shown. Fig. 6 shows a group of three welds. The first (1) is an aluminum butt weld. The arrows *a*, *b*, and *c* indicate a line of incomplete union. The weld is apparently good from the surface, yet if subjected to excessive strain would most likely give way. The second (2) is a butt weld of a light alloy. The arrows *d*, *e*, *f*, and *g* indicate gas inclusions which are not indicated by a superficial examination. The third (3) is a steel butt weld. The arrows *h* and *i* indicate a line of incomplete union, while *j*, *k* and *l* indicate a portion which has been badly overheated.

Three poor steel welds are shown in Fig. 7. The first of this series (4) is a steel angle weld. This is incomplete over practically the entire length. It is particularly evident at *o*, and *p*. Arrows *m* and *n* indicate a portion which was burned. The second of this series (5) is a steel "T" weld. The arrows *q*, *r* and *s* indicate where the welding metal did not unite with the upright piece. This is another weld which was apparently satis-

factory. The third of this series (6) is a steel lap weld. The left side of it is good, however; the right side shows gas inclusions at *t* and *u*.

X-rays have assisted in the perfection of the art of welding and, because of improved methods, welded parts are now used where heretofore they were considered inapplicable.

## Fluoroscopic Methods Described

The fluoroscopic method of X-ray testing is confined chiefly to lighter metals and organic substances, and to the finding of gross defects in manufactured articles such as refractory materials, bakelite castings for alinement of inserts, electrical insulators, golf balls, sheet material of all kinds, etc. With fluoroscopy the shadowgraph of the part tested is projected on a chemical screen which fluoresces in the X-ray beam. The screen is darkened so that the image may be seen by the inspector.

Ionization testing with X-rays is not in common use because of its limitations. This method utilizes the fact that X-rays ionize air, permitting electrical current passage in proportion to the quantity of the ray, and may be used to test the homogeneity of a material. In practice, an ionization chamber, connected to an electroscop, is placed in back of the material tested and the electroscop shows by its rate of discharge, or its rate of current pas-

sage, the amount of unabsorbed X-ray passing through the material tested. This method is most commonly used in the routine test of flowing liquids to note any change of density, indicating change of composition.

## Fine Structure of Materials Revealed

In all the above we have only considered the detection of gross defects, i.e., nothing smaller than a pin point. One of the greatest fields for X-ray inspection is in the revelation of the fine structure of materials, such as the determination of grain size, crystal structure and orientation, chemical composition and state of combination, and the existence of strains. This and other valuable information is readily revealed by the use of X-ray diffraction studies. Our ability to use X-rays in this

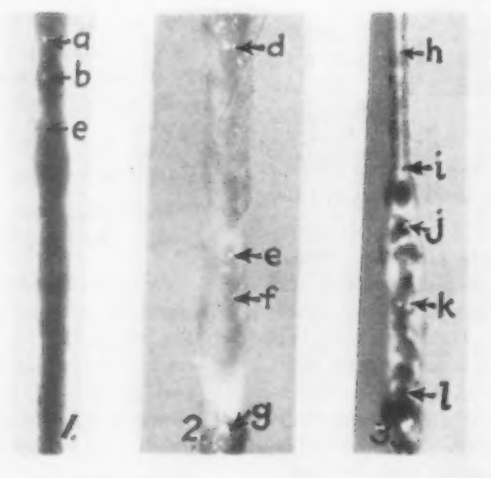


Fig. 6.—Group of Three Bad Welds

Radiographs show defects in an aluminum butt weld (1.), in a butt weld of a light alloy (2.) and in a steel butt weld (3.). For details see text.

\*Secretary, Kelley-Koett Mfg. Co., Covington, Ky. The first part of this article was published in THE IRON AGE, May 1, pages 1290 and 1291.

matter is based on the fact that the interatomic spaces are comparable to the wave length of the X-rays. This enables us to employ crystalline material for diffraction of the X-ray beam in much the same manner as we would employ an optical diffraction grating for the diffraction of visible light.

Apparatus necessary and the method employed in X-ray crystal analysis is in general quite simple. A pin hole beam of X-rays either is projected through or is reflected from the surface of the specimen and the diffraction pattern is recorded on the film at a fixed distance from it. In practice, accessory equipment, which we will not describe in detail here, is usually employed.

#### Valuable Aid in Heat Treatment

This method has proved very valuable in the development of annealing and heat-treating processes in general and in regulating the temper and hardness of various materials. A practical illustration of the use of X-rays is seen in the change of practice recently occasioned at a certain steel foundry casting large steel parts. Former procedure required 6 hr. annealing time. An X-ray diffraction study was made to determine the ideal temperature and time

required. After finding the ideal temperature, the annealing time was reduced to  $\frac{1}{2}$  hr. and the resulting product was of considerably higher quality. The consequent saving can readily be seen.

This type of study may reveal valuable and concise information on the condition of materials, both before and after certain amounts of heat treatment. Professor Clark, of the University of Illinois, has done extensive work in this field.

The above is but a suggestion of the many possibilities opened up by using X-rays in this manner. It is left for the reader to visualize for himself other possible applications to his

own particular problems arising in his plant.

#### Summary

In this article the author has sought to touch briefly on a few of the many uses for X-ray methods in industry. Naturally, it has been impossible to include all possible fields. Fluoroscopic, radiographic, ionization, and diffraction methods all open up new fields of information so desirable to the engineer. An obvious use is in inspection for internal defects, but X-ray work is equally applicable for production control.

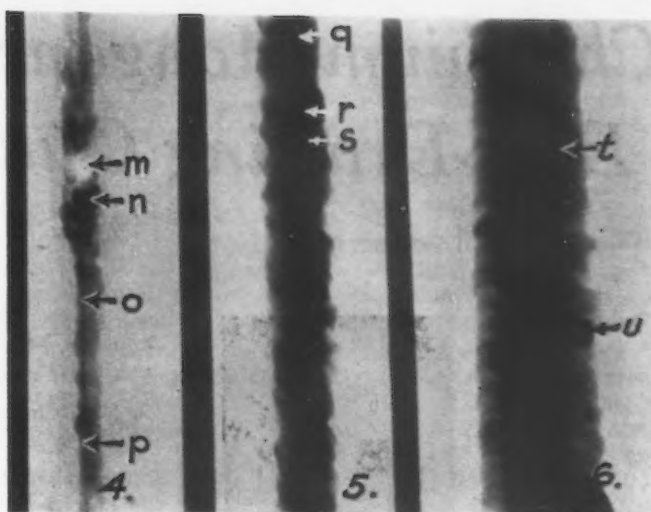


Fig. 7.—A Group of Three Defective Steel Welds

- (4) A steel angle weld. This weld is incomplete over practically the entire length. This is especially evident at o and p. Arrows m and n indicate a portion which was burned.
- (5) A steel "T" weld. The arrows q, r, and s, indicate where the welding metal did not unite with the upright piece.
- (6) A steel lap weld. The left side is good. On the right side, t and u show gas inclusions.

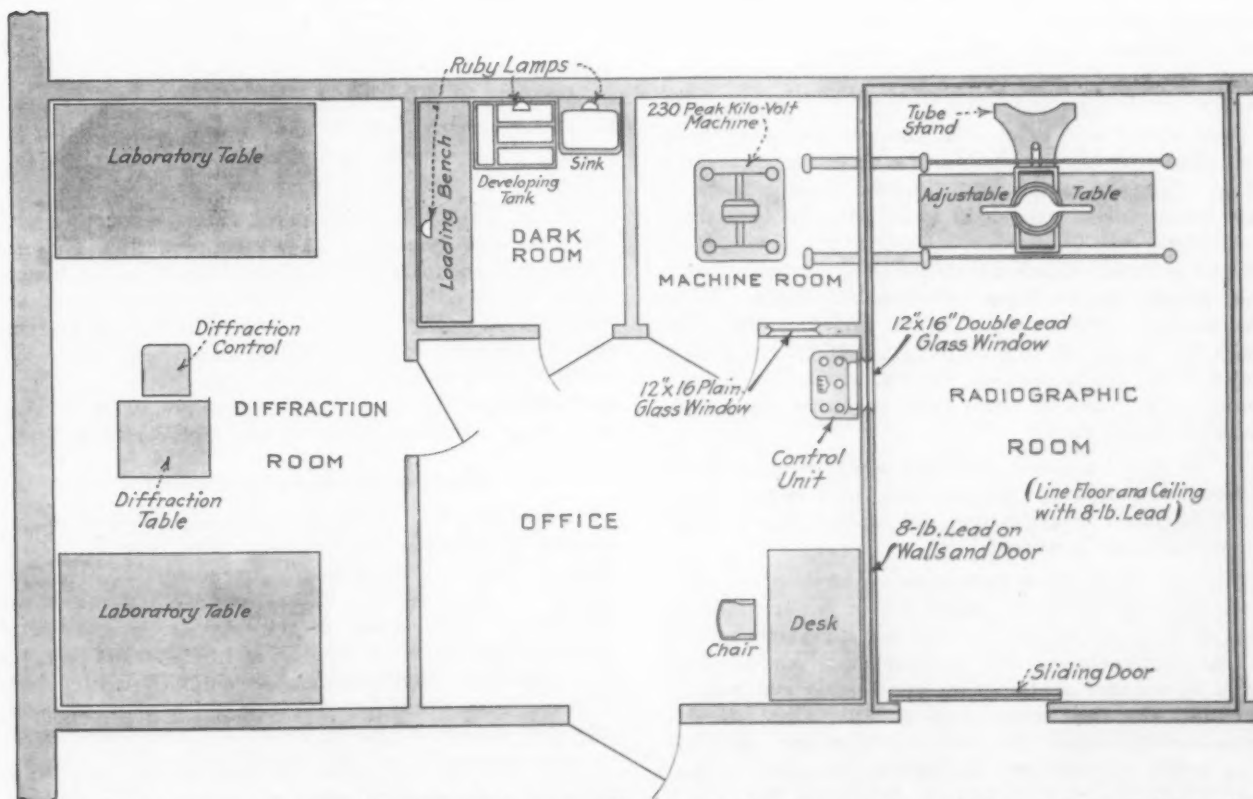


Fig. 8.—Typical Layout For Complete X-Ray Laboratory. Mobile control units are shown which may be moved into the office enabling the operator to control both machines from his desk. Naturally, the size and arrangement of every laboratory varies to suit the individual requirement

# Rustless Chromium-Manganese Steels Have Deep-Drawing Qualities

BY FREDERICK M. BECKET

**A** VOLUMINOUS literature has accumulated during the past decade relating to stainless steels and so-called stainless irons of the plain chromium and chromium-nickel types, but the author is not aware of any publication in the technical literature descriptive of the high-chromium-manganese series of steels. The present paper deals with a fairly wide range of steels in this series.

In 1912 the author started work on the chromium-manganese steels, particularly to develop acid-resisting compositions. The earliest of these had high contents of chromium and manganese, chromium 40 to 52 per cent, manganese 20 to 40 per cent, and carbon down to 0.18 per cent. A more elaborate investigation then followed to develop non-magnetic steels resistant to oxidation and capable of being hot-worked by customary methods. (c) Valuable

service has been rendered by some of these compositions in connection with large electric furnaces at Niagara Falls.

Most stress will be laid in the present paper upon steels selected from the results of a more recent investigation. This has involved 130 electric furnace heats of compositions in the ranges 10 to 30 per cent chromium, 3 to 30 per cent manganese, 0.05 to 2 per cent carbon, 0.02 to 3 per cent silicon, 0.10 to 0.5 per cent nickel, maximum phosphorus 0.025 per cent, and maximum sulphur 0.01 per cent. The resulting ingots varied in size from 2 in. x 2½ in. x 6 in. to 6 in. x 6 in. x 18 in. and 8 in. x 8 in. x 31 in., the larger ones having been rolled in commercial mills. Many of these heats duplicate the compositions of earlier work.

To develop stainless chromium-manganese steels of improved deep-drawing qualities was the principal objective of the latest investigation. Discussion of such steels will predominate in what follows.

Dwelling briefly upon stain-resisting steels of the soft-ductile type containing chromium within the approximate limits of 12 to 16 per cent, it does not appear that under the heat treatments required to impart these qualities particular advantages accrue from appreciable additions of manganese. In fact, under these conditions considerable manganese diminishes stainlessness. However, an interesting series of stainless, hardenable chromium-manga-

The accompanying article is an abstract of a paper read before the American Iron and Steel Institute at New York, May 9. (c) U. S. Patent No. 1,333,151, March 9, 1920.



**E** DUCATED at McGill University, Montreal, Canada, Dr. F. M. Becket received the degree of B.A.Sc. in 1895. He took post-graduate work at Columbia University, where he received his master's degree in 1899, specializing in electrochemistry and metallurgy. He was Perkin Medalist in 1924 and is a past-president of the American Electrochemical Society. His chief work has been in the development of inventions in electrometallurgy, chiefly in the production of ferroalloys, in which field he has patented many processes and products. He is vice-president of the Electro Metallurgical Co. of New York, and a member of several technical associations

nese steels including the above range of chromium has been developed and will be described at another time.

## High-Chromium Steels Affected by Manganese

Steels containing more than about 16 per cent chromium are markedly changed by increasing additions of manganese. If the final product desired is a soft, ductile steel of about 17 to 18 per cent chromium suitable for moderate deep-drawing, there is justification for a manganese content of

about 5 per cent. Such a steel has excellent rust resistance, an attractive color and can be conducted through the various mill operations with greater facility than stainless iron of the same chromium and carbon percentages, but of normally low manganese content.

About 6 per cent manganese changes appreci-

ably the physical characteristics of this type of steel, increasing the strength, toughness and deep-drawing properties. Higher percentages of manganese enhance further the factors that facilitate deep-drawing operations, notably the elongation and reduction of area.

The graphs given in this paper (Fig. 1), together with the associated comments, show the properties of some chromium-manganese steels without the range of compositions described in Table I. [Table not reproduced, but results given in Fig. 1.] Steel makers having before them specifications for these chromium-manganese steels will predict sound, clean ingots; and indeed it appears that less difficulty is experienced in producing such ingots than in making any other steel of the high-chromium type.

## Effect on Deep-Drawing Properties

Considering the steels of low-carbon content, as the manganese increases the most important changes are the greater values for elongation and reduction of area. Attention is directed also to the smaller differences, as manganese is increased, in the physical properties of quenched and air-cooled samples; and here should be noted the relatively small differences obtained with steels quenched from 1050 and 1150 deg. C., a point undoubtedly of commercial interest.

Still stressing the properties required for deep-drawing, even more excellent values are shown by the medium-carbon steels, especially the higher-manganese steels quenched from the higher temperatures. The medium-



carbon steels, as compared with the low-carbon series, show greater differences in the values obtained on the quenched and air-cooled test pieces, as might be expected.

However, despite these figures, experimental work on deep drawing has shown that for a given manganese content the low-carbon steels are superior. Excellent deep-drawing results have been obtained after heat treating at 1150 deg. C. the higher carbon steels containing sufficient manganese; so the choice is a matter of economics involving cost of materials, mill practice and the extent of deep drawing. The steels of still higher carbon contents (up to 2 per cent) need not be described in detail. They are useful in many applications, but lack the properties desirable for deep-drawing operations.

#### Resistance to Corrosion Is Large

Elsewhere (d) the author has pointed out that in plain chromium and chromium-nickel steels subjected to long-time exposure at high temperatures, a minimum chromium content of at least 20 per cent is required for the best results. This is true also of the chromium-manganese series.

The higher chromium-manganese steels (over 20 per cent chromium) possess greater resistance to attack by a larger number of chemical substances. Excellent physical properties may be developed in alloys containing appreciable manganese and from 20 to 30 per cent chromium. For example, let a steel of 20.41 per cent chromium, 11.44 per cent manganese, 0.10 per cent carbon, and 0.22 per cent silicon be cited. On quenching from 1050 deg. C., this steel gave the following properties: Maximum stress, 98,000 lb. per sq. in.; yield point, 49,000 lb. per sq. in.; elongation, 43 per cent; reduction of area, 51 per cent; Izod impact, 120 ft.-lb.; Erichsen 9.75 and Brinell number 163, in addition to remarkable stain resistance. Properties of the same steel air-cooled from 1050 deg. C. are as follows: Maximum stress, 108,500 lb. per sq. in.; yield point, 47,000 lb. per sq. in.; elongation, 38 per cent; reduction of area, 45 per cent; Izod impact, 85 ft.-lb.; Erichsen, 9.60; Brinell number, 163.

Now some of the low-carbon steels of about 17 to 18 per cent chromium and varying manganese will be taken through the mill operations. The commercial mill work has been conducted on ingots of 6 in. x 6 in. and 8 in. x 8 in. sections by men experienced in working plain chromium and chromium-nickel stainless steels of several varieties. It has been noted in every case that mill rolling is performed with greater facility on the chromium-manganese steels.

#### Behavior in Mill Operations

Initial and finishing temperatures required in hot rolling operations for optimum results vary with the composition of the steels and the properties desired in the final products, and initial hot-working temperatures between 1200 and 900 deg. C. have been found appropriate; so, in view of the many variables, elaboration at this time seems unnecessary. However, it should be emphasized that finishing temperatures much below 900 deg. C. are not safely employed with these steels of the medium-manganese variety, if pickling difficulties are to be avoided with some of the ordinary pickling solutions.

In the art of cold rolling, the experimentalists and the mill men agree that the chromium-manganese steels will withstand without injury a greater amount of cold work than the plain chromium steels. Chromium-manganese steel commercially cold-rolled to 22-gage sheets has given Rockwell "B" values ranging from 78 to 82 after being fully annealed.

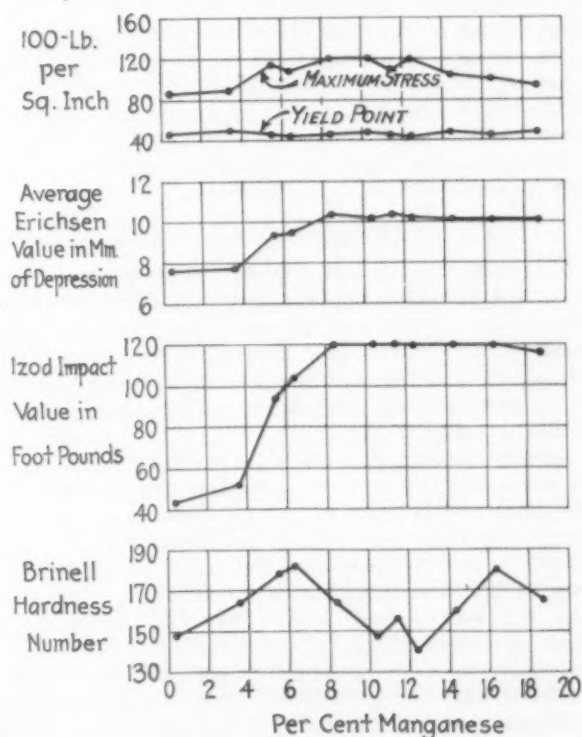
(d) "Chromium Alloys," *Mining and Metallurgy*, December, 1928, and January, 1929.

These steels have been subjected to the action of many different pickling solutions. The one most satisfactory thus far developed contains 1 to 2 per cent hydrofluoric acid and 5 to 10 per cent nitric acid, used between 50 and 70 deg. C. Good results may be obtained in a little longer time by substitution of sodium fluoride for hydrofluoric acid. No brightening dip is necessary after pickling in these solutions.

Polishing does not present serious difficulties. In fact, though the author does not wish to claim relative ease of polishing the chromium-manganese steels in the absence of much more commercial work, some skilled in this art have noted an advantage in this direction.

#### Successful Deep Drawing

Successful deep drawing has been performed on the low-carbon, 17 to 18 per cent chromium steels, containing 7 per cent manganese. The physical properties would not lead one to predict so satisfactory deep-drawing results, and indeed as a margin of safety in the case of heavy



Effect of Manganese on the Strength, Ductility, Toughness and Hardness of Low-Carbon Steel with 17 to 18 Per Cent Chromium

deep drawing a higher manganese content is recommended.

Chromium-manganese steels weld more satisfactorily by the oxy-acetylene process than the plain high-chromium steels, resembling in this respect the chromium-nickel steels. Equally satisfactory results may be obtained when the electric arc process of welding is applied.

All chromium-manganese steels of the low-carbon type containing chromium higher than about 16 per cent are remarkably resistant to atmospheric corrosion in the quenched and air-cooled conditions.

Many steels made for this investigation have been subjected to attack by a great variety of industrial chemicals. Briefly, the chromium-manganese steels are not resistant to the attack of so great a variety of corroding media as are the chromium-nickel stainless steels, although to a relatively large number of important chemicals they are

equally corrosion resistant.

An important feature concerning corrosion it is well to emphasize, however. The plain high-chromium steels are known to resist to a marked degree the high temperature reactions of sulphur compounds, particularly the steels containing over 18 per cent chromium. Fortunately it is, therefore, that the chromium-manganese steels, which have more advantageous physical properties at high temperatures, possess high resistance to attack by sulphur compounds.

Laboratory tests conducted on commercial chromium-nickel steels of the 18 per cent chromium, 8 per cent nickel type and chromium-manganese steels of the 18 per cent chromium, 8 per cent manganese variety have shown that at 900 deg. C. the attack by concentrated, moist sulphur dioxide is much greater on the chromium-nickel than on the chromium-manganese steels. At lower temperatures, 600 deg. C., for example, the difference is much less marked.

#### Copper Additions Enhance Properties

This investigation has included chromium-manganese steels to which several metals have been added—tungsten, molybdenum, copper and others. Of particular interest are the relatively high yield points shown in some of the tests at 600 deg. C., and the improved strength at 900 deg. C. accomplished through the addition of 5 per cent cobalt.

Results obtained on some of the steels to which copper has been added are interesting because small additions of this comparatively inexpensive metal considerably enhance some of the properties required for deep drawing. Stainlessness is not diminished by this addition; on the contrary, in many corroding media the copper-bearing, chromium-manganese steels show improved resistance to attack, an effect found by several others in connection with the employment of copper in plain chromium steels.

Copper additions are effective from approximately 0.5 to about 3 per cent. The higher copper contents should not be used in steels of the higher percentages of manganese, since too much copper renders these chromium-manganese steels hot short.

Samples from all the heats of chromium-manganese steels made at one time or another have undergone heat treatment, tensile tests and microscopic examination; almost all have been subjected to chemical corrosion and other tests. In this way much information has been

#### ☐ A New Rustless Steel

\* \* \*

#### ☐ Composition Ranges—Cr 17 to 18 and Mn 5 to 7 Per Cent.

\* \* \*

#### ☐ Deep Drawing Properties Are Satisfactory

\* \* \*

#### ☐ Excellent Rust Resistance and Attractive Color

\* \* \*

#### ☐ Addition of Copper Increases Deep Drawing Properties

accumulated, and it is hoped that the most interesting of this will be presented in the future.

#### Discussion

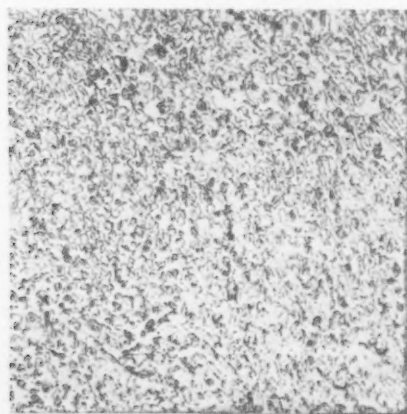
IN the presentation of his paper, Dr. Becket diverged from the printed text to emphasize the deep drawing qualities of the alloys and exhibited samples of cups and other commercial shapes made from the sheet. He also said that welded joints made in the alloys are exceedingly strong, and are usually free from many of the defects which sharply limit the construction of chemical equipment from some of the other well-

known corrosion resistant materials.

Dr. E. C. Bain, research laboratory United States Steel Corporation, Kearny, N. J., said that the text of the paper minimized the enormous amount of work which had been done, in fact, was necessary to do to investigate systematically any alloy system. Dr. Becket's work was notable also as being laboratory work done under steel making conditions—that is to say, the results were certainly capable of being duplicated in any carefully supervised steel plant. Certain theoretical generalities were confirmed by this work on chromium-manganese, such as Guertler's principle that any metal which enters solid solution with another will enhance the strength of the latter, and that tungsten, molybdenum, cobalt and chromium, in the order named) were effective in enhancing the strength of iron at moderately elevated temperatures. In one respect these new results of Dr. Becket's are unexpected—namely, it was thought that manganese had a pronounced stabilizing effect on austenite (as for instance in Hadfield's high manganese steel), but this apparently does not hold for alloy containing approximately the same manganese, but low in carbon and with 17 per cent or more in chromium.

#### Investigation of Valve Steels

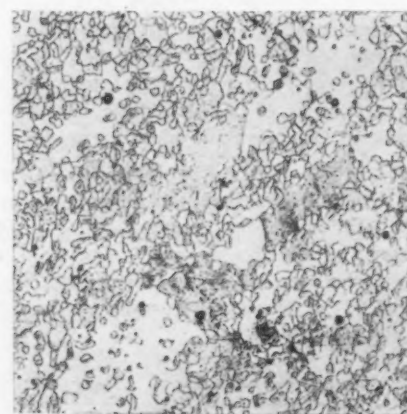
PLAIN chromium, silico-chromium, nickel-chromium and cobalt-chromium steels were investigated by A. R. Page and J. H. Partridge, and the results reported May 2 to the (British) Iron and Steel Institute. The austenitic nickel-chromium steels containing 2 per cent tungsten were found to have the best characteristics for exhaust valves for gas engines, namely, good mechanical strength combined with toughness at ordinary and elevated temperatures, and resistance to scaling at 800 deg. C.



At Left Is a Chromium Manganese Steel Quenched from 1000 Deg. C.

At Right Is a Chromium Manganese Steel Quenched from 1150 Deg. C.

Both Magnified 100 Diameters





# Steel Prices May Drop Still Further

BY LEWIS H. HANEY

Director, New York University Bureau of Business Research

**B**USINESS prospects look brightest when attention is centered on a period several months in the future.

Those content to judge conditions by the rate of production may be satisfied with conditions prevailing, as production rates are little, if any, below normal. Those, however, who recognize that production in a period of excess supplies may not be desirable see weakness rather than strength in the maintenance of operating schedules.

One ill-considered statement which has gained currency has been that "inventories are low." Figures of the Department of Commerce indicate that stocks of manufactured goods, at end of March, were 26 per cent above the average for 1923-1925. They were larger than a year ago. They increased in March. How can we expect relief from the pressure of excess supplies until these stocks are reduced? This is the question producers of copper, zinc, textiles and automobiles have been asking.

Last week, we saw that steel production in March was considerably above indicated requirements; we now know that steel production in April decreased less than usual for the season. This week, we have to confront a price chart that is none too encouraging.

## Upturn in Raw Material Prices Not Yet in Sight

Bradstreet's index of commodity prices on May 1 was 2.2 per cent lower than on April 1. It was 12.9 per cent below a year ago, and the lowest since July, 1921. These facts reflect the existence of ample supplies, reduced purchasing power, and uncertainty as to the future.

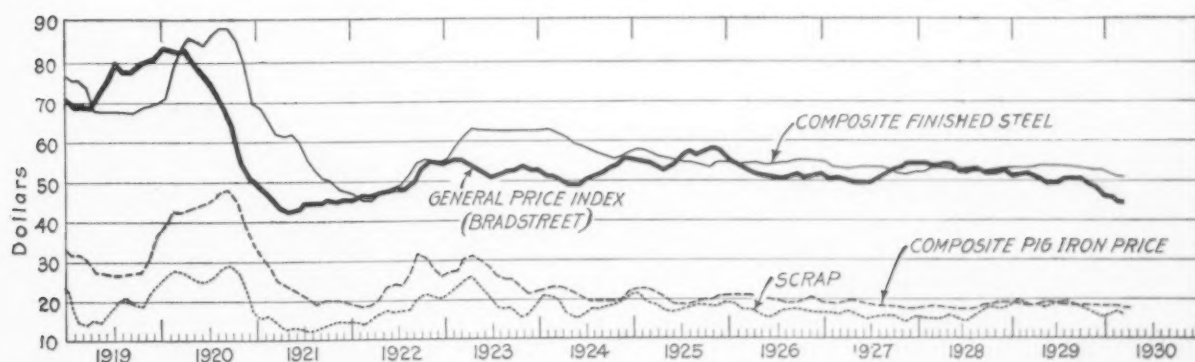
Certainly no upturn in raw material prices is yet in sight (the Bradstreet index is largely influenced by such materials), and no recovery in general business is at all likely until such an upturn is established.

Multiplying the Bradstreet index by 4, we get \$43.76. THE IRON AGE composite index of finished steel is now about \$50 a ton, or 2.23c. a lb. One cannot safely go by precedent in such matters, but on the basis of past performance it would not be surprising to find the average price of finished steel falling to about \$46 a ton, or 2.05c. a lb., before the market becomes stabilized. At least, some further decline is strongly indicated.

## Pig Iron Prices High in Comparison with Steel

Steel scrap prices averaged lower in April, and the markets for old material do not yet appear to have become definitely stabilized. Pig iron markets have been holding fairly well, but, with steel prices weak and pig iron production so ample when compared with steel production, there is no real basis for strength. The price is high in comparison with steel prices.

Such conclusions do not result from any special weakness in the steel situation; that industry, indeed, appears to be appreciably better than average. The general trend of prices is still downward the world over. Last week the *Annalist* index reached the lowest post-war point, and in a long list of commodities 53 declined while only 22 advanced. The steel industry is so basic and so interrelated with business in general that its price structure must become adjusted to the general level.



Steel Prices, Being Above Their 4-to-1 Ratio to Bradstreet's Commodity Index, Are Expected to Drop Further



# This Issue in Brief

New stainless steels with excellent ductility and weldability discovered. Have at least 18 per cent chromium and 6 per cent manganese.—Page 1468.

\* \* \*

Normal good business year will be enjoyed by the steel industry in 1930, concludes President Schwab of the American Iron and Steel Institute, after a study of market influences and factors.—Page 1463.

\* \* \*

Production control by means of X-rays is as practicable with modern equipment as its use for laboratory research and inspection for defectives.—Page 1466.

\* \* \*

Corrosion of tin plate during long voyages to export destination is prevented by a variety of metal or oil paper box-linings.—Page 1461.

\* \* \*

Savings in foundry production have been effected by designing flasks for each run of difficult castings so as to eliminate gaggers and nails in the molds.—Page 1462.

\* \* \*

Pig iron sometimes said to have impurities which cannot be removed in subsequent refining. Best way to avoid this condition is to run blast furnace with a hot limy slag.—Page 1457.

Efficiency of labor steadily increasing in the iron and steel industry. Census shows steady decline in employees despite equally steady growth in tonnage.—Page 1505.

\* \* \*

Scientific research has brought about the machine age, Dr. Arthur D. Little tells the American Iron and Steel Institute, and unremitting fundamental investigations are necessary to keep the industry abreast of its markets.—Page 1459.

\* \* \*

Great savings in maintenance as well as improved operating rates will result from use of modern anti-friction bearings, centralized grease and oiling stations, and proper lubricants.—Page 1455.

\* \* \*

Commercial heat treating plant finds that modern equipment and automatic control, according to pre-determined cycles, are profitable even on work ranging from a small high speed tap to an aircraft fuselage.—Page 1449.

\* \* \*

Mergers not necessarily good, nor is mere bigness necessarily bad. The real test is whether the whole community will benefit from better diversification, stability and efficiency of the industry, said Charles M. Schwab.—Page 1464.

All-purpose aluminum alloy of high strength developed for Rolls Royce aircraft engines.—Page 1458.

\* \* \*

Ductile zinc coatings on galvanized steel may be made with a relatively thick layer of zinc if the region where the coating and the iron interpenetrate is quite thin.—Page 1452.

\* \* \*

Wages will be maintained, as well as the eight-hour day, by United States Steel Corporation, said President Farrell.—Page 1448.

\* \* \*

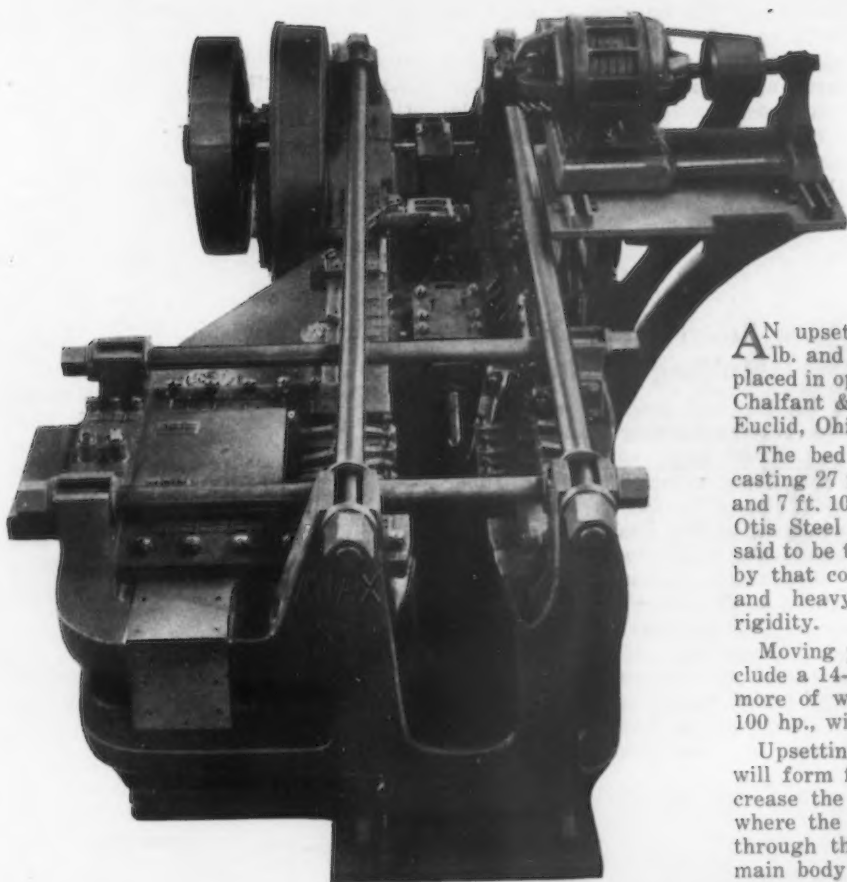
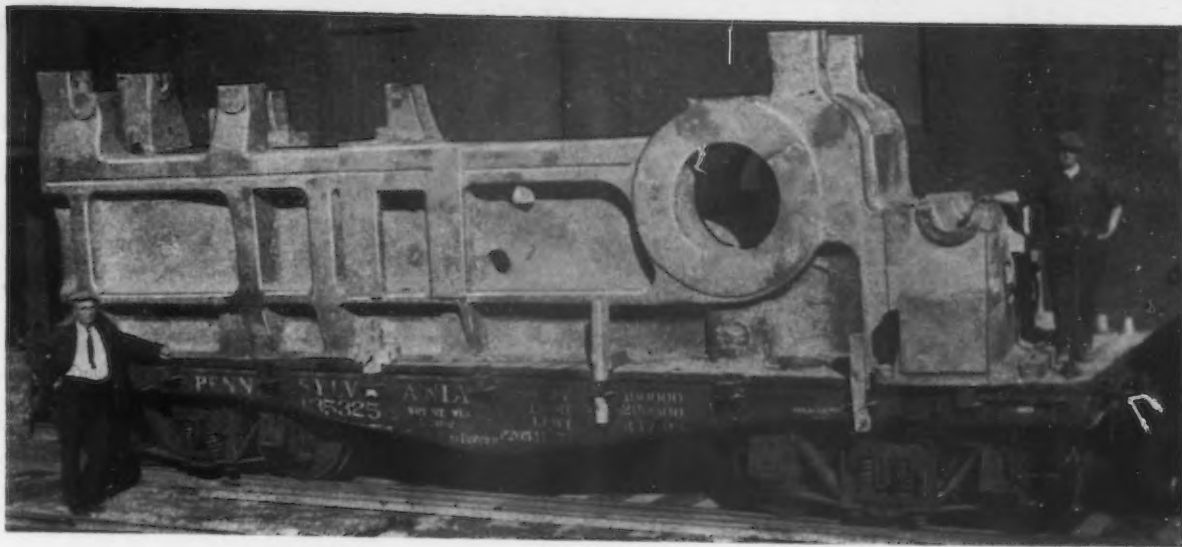
Inventories are not as low as desirable or as supposed, believes Dr. Haney. He looks for a moderate rate of manufacture and declining prices until the excess stocks are consumed.—Page 1471.

\* \* \*

Copper is a useful addition, up to 3 per cent, to a newly discovered group of corrosion and stain resistant steels, since it increases the ductility and ability to be deep drawn into cups and tubing.—Page 1470.

\* \* \*

Steel Corporation official says that American products can compete in any foreign market not hedged in by prohibitive tariff, and decries countervailing duties recently established by Canada.—Page 1448.



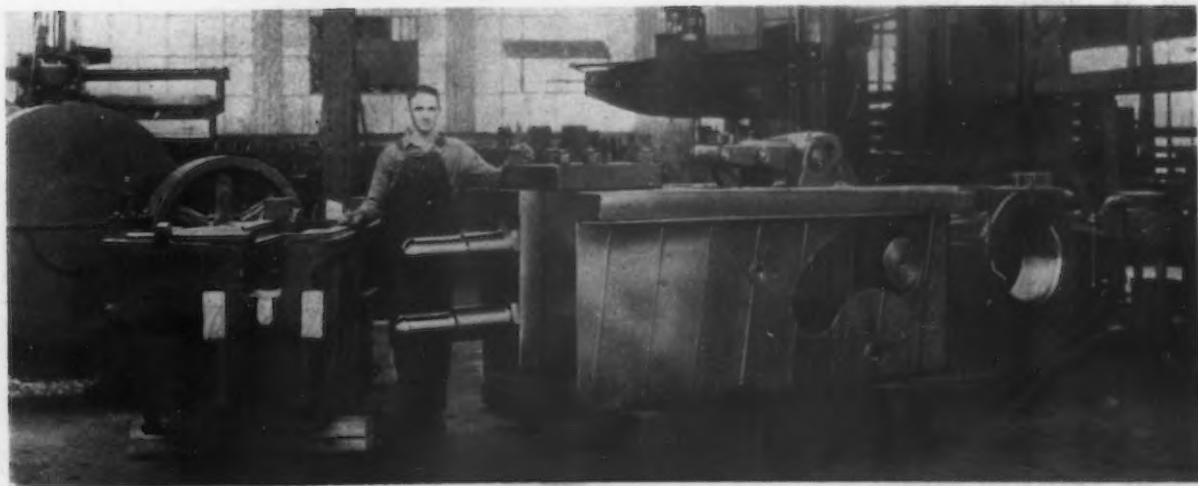
## Large Upsetting Forging Machine Built

AN upsetting forging machine, weighing 410,000 lb. and said to be the largest yet built, has been placed in operation in the Pittsburgh plant of Spang-Chalfant & Co. It was built by the Ajax Mfg. Co., Euclid, Ohio.

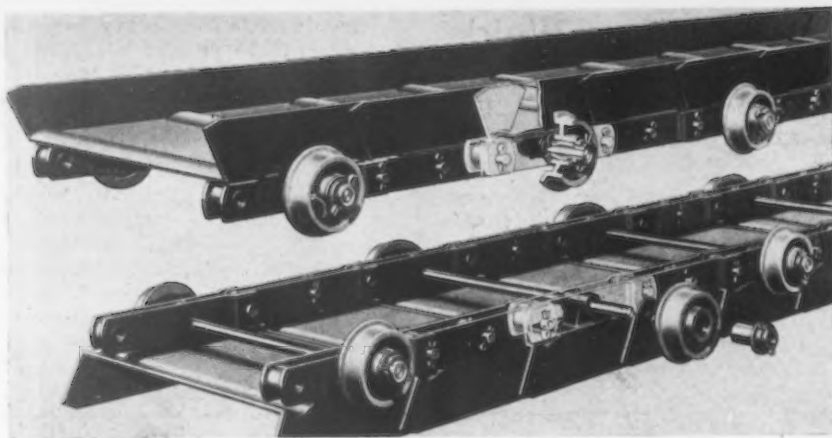
The bed (top of page) is an open-hearth steel casting 27 ft. 6½ in. long overall, 11 ft. 2½ in. wide, and 7 ft. 10½ in. high. This casting was made by the Otis Steel Co., requiring 128 tons of metal, and is said to be the largest and heaviest casting ever made by that company. Continuous crankshaft housings and heavy ribbing are designed for maximum rigidity.

Moving parts in the operation of the machine include a 14-ton header slide (lower view) and 22 tons more of working parts. Drive is from a motor of 100 hp., with twin gearing and twin flywheel action.

Upsetting tubing is the work of this machine. It will form flanges on the ends for joints, or will increase the wall thickness at the ends of drill pipe where the threads are cut, thus providing strength through the root of the thread as great as in the main body of the tubing.







## Leak-Proof Conveyor for Foundry Service

**A**N apron conveyor that will not spill sand and is suitable for the severely abrasive service encountered in foundry shakeout work is being marketed by the Chain Belt Co., Milwaukee, under the trade name of Rex Leak-Proof.

These conveyors may be used not only to handle sand from hoppers under shakeout gratings, but also to receive entire snap-flask molds dumped directly on the conveyor. In the latter use, the apron conveyor is at the end of a series of parallel gravity roller conveyors which cover the space between the molding floor and the shakeout point. After pouring and cooling, the molds are removed from the gravity rolls and the sand and castings dumped on to the apron conveyor, the bottom boards being piled up and returned to the molders. Thus the apron conveyor may serve a large number of molding floors, carrying the mixed mass of sand and castings without leakage to a single discharge chute where the castings are screened from the sand. The castings then go directly to the cleaning room while the sand is reconditioned and distributed to the molders.

Designed for foundry service, these Leak-Proof apron conveyors are provided with rugged, tight-fitting, overlapping steel pans with telescoping ends electrically welded to form a one-piece pan. The pans are mounted by means of equalizing saddles on two strands of Chabelco steel-bushed roller chain and are easily detachable. Through-rods pass through the center of the chain links instead of through the articulation points of the chain, which arrangement permits removing the pans, as well as the outboard rollers and renewable bushings, without disturbing the chains. It is stated that most of the wear on the rollers takes place on the horizontal track rather than at the sprockets and putting the rollers outside of the chain permits use of large diameter rollers that operate with minimum friction. These rollers are made of hard white iron and revolve on hardened steel bushings which may be renewed conveniently without delaying operations or disturbing the balance of the equipment. Heavy cast washers on

the ends of the through-rods take end thrust and eliminate cotter pin wear.

To accurate workmanship, as well as use of large diameter outboard carrying rollers, is attributed less than usual power consumption. Ale-mite lubricating fittings can be provided in the rollers; when used, they are always accessible because of their position outside the chain. Several sizes of this apron conveyor can be furnished.

## New Small Hand Rollover Molding Machine

**U**SE of ball bearings in the main pattern drawing guide is unique in the new small hand rollover machine being exhibited by the Tabor Mfg. Co., 6225 Tacony Street, Philadelphia, at the Foundry Exposition in Cleveland this week.

Application of such bearings is intended to eliminate trouble and wear due to sand and dust in this vital part of the machine. All other bearings are fitted with renewable bronze bushings which require no lubrication.

This machine has a 14 x 16-in. table, an 8-in. pattern draw and

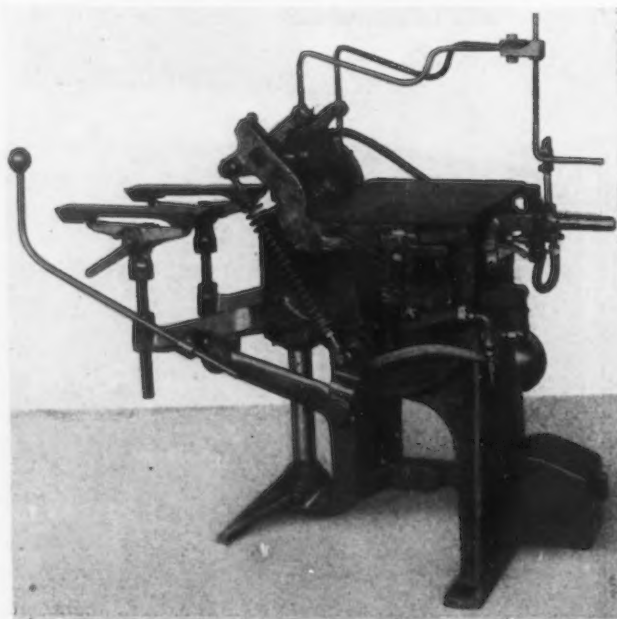
measures 29 in. from floor to table. It can be furnished either for hand ramming or for jar ramming. The hand ramming machine can be converted readily to jarring type at any time. The jarring valve is knee-operated and the vibrator valve is so positioned on the rollover frame that the operator may actuate it with the same hand used in rolling over the frame. The piston of the jarring machine is 3-in. in diameter and 10-in. long, which relative proportions are intended to assure both a hard ramming blow and increased length of life.

Adjustment of the counterbalance springs, the core plate clamps and the leveling device, necessary in changing from one job to another, can be made by hand. The leveling device is of four-point design, with aluminum core-plate supports attached. A simple adjustment is provided for taking up wear of these parts. The steel rollover frame has adjustable stops and is disengaged from the jarring machine during the jarring operation. A hand draw lever is standard equipment, but a foot draw lever can be readily substituted, if desired. These levers may be located on either side of the machine.

Copperweld Steel Co., Glassport, Pa., has standardized an electric furnace steel for the cores of all copperweld wire, strand and ground wires. Two new grades of wire and strand, namely "high strength" and "extra high strength" have replaced the older standards, and are rated about 50 per cent stronger than the old product. Durability and electrical conductivity are said to be unchanged, and the new materials will enable many economies to be effected in transmission line construction.

Palmer-Bee Co., Detroit, has opened a district sales office at 30 Church Street, New York, in charge of H. W. Ruth.

**B**ALL Bearings in the Main Pattern Drawing Guide Eliminate Trouble and Wear Due to Entrance of Sand and Dust. The machine can be furnished either for hand or jar ramming



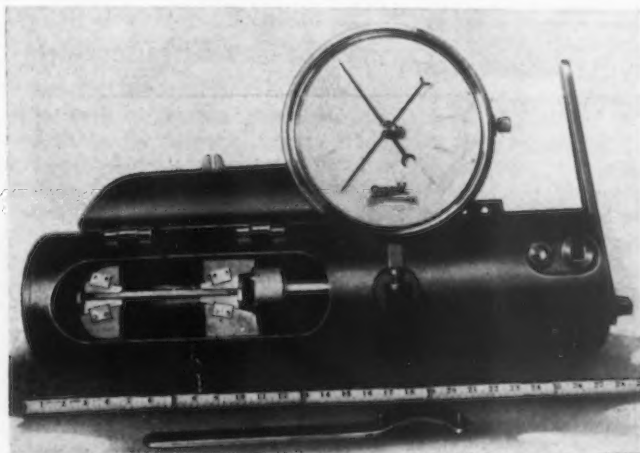
## Portable Machine for Testing Welds

### Self-Contained 40,000-Lb. Capacity Units Also Adapted for Routine Tensile and Bend Tests

**F**OR rapid field testing of welded joints, the Southwark Foundry & Machine Co., 400 Washington Avenue, Philadelphia, has made available the unusual equipment here pictured.

Measuring 6½ in. in diameter and 28 in. in length and weighing 165 lb.,

A hand-operated piston type pump is built into the end of the cylinder of the machine. Total load is indicated directly on an 8½-in. diameter face Emery dial having zero adjustment and maximum hand, the dial of every machine being calibrated before ship-



**S**PECIMENS of Welded Joints Are Tested in the Field. For shipping, the dial is removed and put in a separate case, the pump handle is placed inside the machine and the cover closed and locked. The illustration shows the top of the machine with specimen under test

with the load indicating gage, the machine is compact and portable. Another feature that fits this 40,000-lb. capacity, 7-in. stroke unit for field use is its ruggedness, the machine being designed to stand comparatively rough handling without damage and without impairment of its accuracy, which is said to be between 1½ and 3½ per cent.

These machines are being used for field tests of welds in pipe lines, the welding being controlled by periodical tests of specimens, and in some cases by testing coupons cut out of the pipe lines being welded. They may also be employed for routine testing in small laboratories and in plant testing departments where investment in a large universal machine might be unwarranted.

A special form of the machine for 8-in. gage lengths can be furnished, as well as a compression unit for making bend tests on welded specimens and for testing concrete cylinders. Development of the machine, designated as the Oxweld, in collaboration with the Union Carbide & Carbon Research Laboratories, was noted in *THE IRON AGE* of Sept. 19, 1929, in connection with the address of F. G. Tatnall of the Southwark Company at the fall meeting of the American Welding Society.

Arrangement of the 7-in. stroke machine may be seen in the illustration. When the unit is to be shipped, the dial is removed and placed in a separate case, the pump handle put inside of the machine and the cover closed and locked. When closed, the machine presents a smooth cylindrical surface with no projections.

ment against a standard Southwark-Emery testing unit. The wedge grips are manipulated by the fingers.

### Folding Steel Horses

**H**ANDY to set up and knock down and convenient to store, the folding steel horse illustrated is offered by the Toledo Pressed Steel Co., Toledo, Ohio, for use in steel mills, foundries and machine shops. This device utilizes lumber of standard size for the rail, which is gripped tightly by the upper jaws when the toggle cross member is clamped down. The



Standard Size Lumber Is Used for the Rail, Which Is Gripped Tightly by the Jaws When the Toggle Is Pressed Down. Convenient portability and storage are features

legs are made from heavy 3-in. ribbed channel sections and all joints are pivoted and permanently fastened.

The horse will support its weight without sway, and when not in use it may be folded compactly and conveniently transported or stored. Uses include benches, barricades, scaffolds and miscellaneous supports. In the assembly line these folding steel horses may be employed for supporting the product upon which work is being done, and in the machine shop they may be used for supporting "next jobs" beside machine tools. They are made in eight different heights, from 18 to 60 in., and different models take 1-in. or 2-in. wood rails, on edge, or 2 x 8-in. flats. The weight of a pair of 25-in. horses is 24 lb.

### Airbrush Applies Several Colors at Same Time

**M**ULTIPLE-HEAD universal airbrushes for applying two, three or more colors at the same time under accurate control are being marketed by the Paasche Airbrush Co., 1909 Diversey Parkway, Chicago. It is claimed that application of two or



Application of Two or More Colors At One Time Saves Time and Permits Unusual Decorative Effects

more colors at one time not only saves time, but makes possible unusual decorative effects.

Each color is controlled independently so that all colors may be applied at the same time or any of them shut off at will; control of the width of line, from fine lines to wide spray, is also provided. Multiple heads in 40 different combinations provide for wide range of coating. They may be used as single units or expanded into gang units of any number of airbrushes, manually or air operated. They may be used with overhead containers or pressure feed tanks from 3 to 200 gal. capacity, when high speed production is desired.

Brown Instrument Co., Philadelphia, has consolidated its Chicago sales office and Midwestern factory branch at 155 East Superior Street, Chicago.



## Economies Claimed for New Mill-Type Grease Pump

FOR pumping heavy mill greases, the Hills-McCanna Co., 2349 Nelson Street, Chicago, is offering the Anderson mill-type grease pump here shown. Simple and rugged construction are features emphasized, as well as unusual pressure capacity and positive action in delivering measured quantities of lubricant. By substituting mechanical means the hazard of injury that is present where hand feeding is employed is eliminated. The pump is said to handle any grease at present developed.

Grease is introduced into the feeding system of the Anderson pump by means of a displacement pump operating a positive mechanical valve that is opened on the suction stroke and closed prior to the discharge stroke. A distributor head with the requisite number of leads is directly connected to the discharge side of the pump. Indexing of the head is secured by means of a ratchet attachment which allows indexing on the suction stroke of the pump and remains fixed during the discharge stroke, after which it indexes to the next lead and continues in order.

Delivery lines attached directly to the distributor head lead to the equipment bearings. To facilitate handling of heavy grease during cold weather, a steam heating element is installed on the bottom of the hopper casting directly above the intake valve. The standard grease hopper has a capacity of approximately 50 lb., but other sizes can be furnished. A screen is installed in the bottom of the grease hopper to prevent entrance of foreign matter into the pump. Provision is made for adjusting the stroke of the pump to regulate the

amount of grease delivered, also the speed of the drive.

The Anderson grease pump is built in a number of sizes, the present models consisting of 4, 6, 8, 10 and 12 feeds per unit. Special sizes up to 24 feeds per unit can be furnished. Where more than 24 feeds or leads are needed, two or more units may be connected with a common driving mechanism to secure the desired number of feeds. The pressure capacity of the Anderson pump is rated as sufficient to deliver grease under any bearing pressure to a maximum of 5000 lb. per sq. in.

## Spot Welder Arranged for Automatic Operation

SPOT welding of two pieces of  $\frac{1}{2}$ -in. stock are within the capacity of the 150 kva. heavy-duty machine illustrated, which is being produced by the Swift Electric Welder Co., Detroit.

This machine is entirely automatic. The upper head is actuated by a cam and toggle driven through worm reduction gearing. The lower horn is adjustable to vary the opening between the electrodes. Both upper and lower electrodes and horns are water cooled, water flowing through these parts continuously, assuring maximum cooling and preventing the possibility of overheating and damage to the die points during operation. The upper horn or head slides on long bearing surfaces. Adjustable taper gibs are provided for taking up wear, and ample provision has been made for lubricating the sliding surfaces.

Unit construction has been used wherever possible, and all working parts, although entirely inclosed within the housing of the machine,

are easily accessible for oiling and other maintenance. The motor, which is also within the housing, may be removed conveniently, when necessary. The frame of the machine is made of semi-steel. The cam furnishes a means of automatic current control, while the six-point regulator switch permits the determination of secondary voltages and thus the regulation of heat for welding various sizes of stock within the capacity of the machine.

Three different sizes of the machine, 60, 100 and 150 kva., are built.

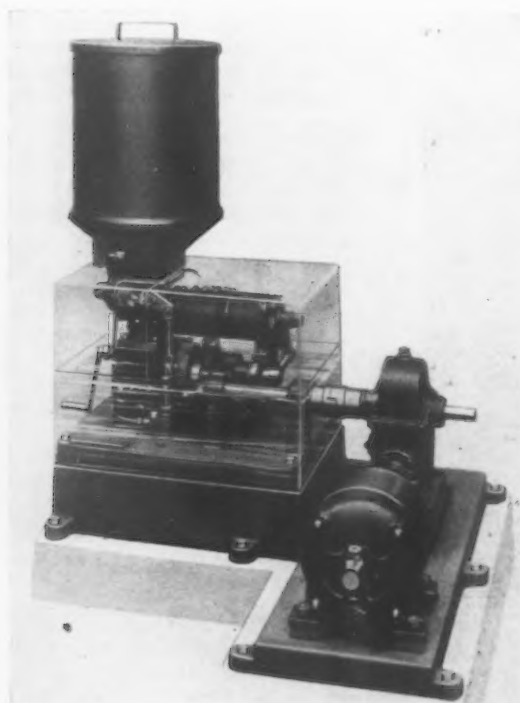
## Intensive Course Offered in Gas Engineering

University of Illinois, Urbana, will for the fifth consecutive year offer a short course in gas engineering in cooperation with the Illinois Gas Association. Dr. D. B. Keyes, professor of industrial chemistry, will be in charge of the course, which will occupy two weeks commencing June 16.

Four lectures or discussion periods will be held each day, conducted by members of the university faculty, or specialists from industry. Subjects relating to the industrial utilization of gases will be adequately presented. Among the lecturers will be Prof. W. Trinks of Carnegie Institute of Technology ("Principles of Furnace Design and Construction") and R. G. Guthrie, president American Society for Steel Treating ("General Applications to Metal Heating").

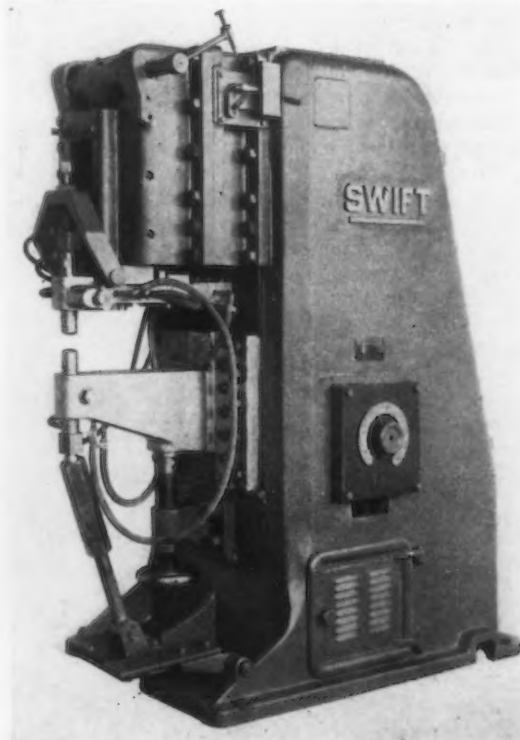
Applications for enrollment should be addressed to George Schwaner, secretary, Illinois Gas Association, Springfield, Ill.

Genfire Steel Co., 143 Federal Street, Boston, has moved to larger quarters at 136 Federal Street.



(At Left) Phantom View of Anderson Mill-Type Grease Pump Showing Mechanism Beneath the Dust-Proof Enclosure

(At Right) Two Pieces of  $\frac{1}{2}$ -In. Stock May Be Spot Welded On This 150 Kva. Automatic Machine



# Compound for Lapping Tungsten Carbide

Satisfactory Edge Claimed to Be Produced—Tools May Be Polished in Second Lapping Operation

**A**N abrasive compound for the rapid and inexpensive lapping of tungsten carbide has been brought out by the Carborundum Co., Niagara Falls, N. Y.

According to H. J. Wills, engineer of the company, the principal objections to wider application of lapping to tungsten-carbide tools have been the high cost of the diamond dust generally used and the idea that the dull appearance of the edge when lapped with a less expensive abrasive used loose on the lapping disk is not indicative of a good finish.

In this connection Mr. Wills comments as follows on the accompanying photomicrographs: "Inspection of these will show that the difference between a bright surface (Fig. 1) and a mat surface (Fig. 2) consists of scratches on the bright surface and a shallow pitting on the mat surface. The working edge of the tool in Fig. 2 is actually superior to that in Fig. 1 and the abrasive used cost but 70c. a lb. A second lapping operation with a finer grit on a wood disk, or lapping against a dry plate, will produce a polish, but the results will serve only to please the eye and will not influence the efficiency of the tool."

Application of the abrasive compound developed by the Carborundum Co. is outlined by Mr. Wills as follows:

"On the usual type of cast-iron lapping disk is mounted a whitewood or mahogany disk of approximately one-half the diameter of the cast-iron disk. The object of the wood disk is to provide a softer lap for finishing and by the use of this combination disk, a faster cutting compound may be used as a first operation.

"In general, the lapping on the cast-iron disk with Carborundum brand finishing compound in the grading R40 Fine is sufficient to produce a sharp edge and eliminate all chips and grinder marks. If a finer finish is desired, the same compound on the wood

disk may be used. This grade of compound leaves a dull mat finish from the cast-iron lap and a semi-polish finish from the wood lap.

"The best practice is to apply a small amount of R40 Fine compound on the cast-iron disk and hold the tool firmly to its face in such a position that the direction of rotation is against and at right angles to the cutting edge. When a satisfactory edge is obtained on all sides of the tool, the lapping operation may be repeated on the wood disk if a semi-polish surface is desired. In this second lapping, however, the tool should be held in a position that will lap at 5 deg. to the cutting edge from back to front. If the tool is of such shape that it can be held without tilting, this finishing operation should be done with a swinging motion across the direction of rotation from 90 to zero degrees to the edge and from the back to the front.

"If a higher finish is desired, the use of grading R40 Ex. Fine on the wood disk is suggested.

"It should be noted that, with the use of Carborundum brand finishing compound, charging of the lapping disk is not necessary, nor are special grades of cast iron required.

"The speed of the lap is important, but is not critical within certain limits of the recommended speed. In general a speed from 900 to 1200 surface ft. per min. will give satisfactory results, but at higher speeds the finish is noticeably affected; at 4000 ft. per min., for example, the lapping action is practically nil.

"The smaller tungsten-carbide drawing dies can be lapped economically with the R40 Fine finishing compound in conjunction with the ordinary lapping tools employed for this class of work.

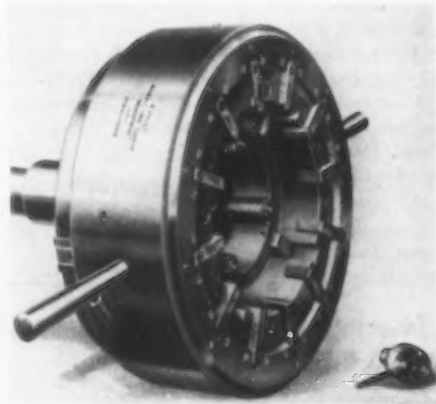
"When necessary to cut a groove in tungsten-carbide tools, it may be accomplished by substituting an aluminum or brass wheel for an abrasive wheel in a grinder. Apply R40 Fine

compound to the tool and bring the metal wheel to the work in the same manner as an abrasive wheel."

## Builds 14-In. Capacity Self-Opening Die Head

**W**HAT is thought to be the largest stationary type self-opening die head ever made for use on turret lathes has just been completed by the Modern Tool Works division of Consolidated Machine Tool Corporation, Rochester, N. Y.

This die head has capacity for cutting threads from 10 to 14 1/4-in. diameter. Its outside diameter is 21 1/2 in. and its length, less shank, is 8 1/2 in. The wide range of thread-cutting capacity is obtained by means of a chaser-holding ring for the



Stationary Type Self-Opening Die Head for Use On Turret Lathes. The capacity is for cutting threads from 10 to 14 1/4 in. in diameter

smaller threads, this ring being fitted into the bore of the die head. Chaser slots in the ring and die head are ground together to assure proper alignment; use of the ring gives additional support to the chasers when cutting the small diameter.

Easy and positive operation comparable to that of a die head one-eighth its size is attributed to mounting the cam ring on two sets of roller bearings, one set in the front and one set in the rear. Each chaser of the 12 chasers used is held in its slide by one screw and can be readily removed. The chaser slides, in turn, are cammed to the large cam ring so that at the point of opening each chaser is pulled positively out of the cut.

There are four points of lock for holding the die in its closed position. Adjustment for size may be made conveniently and a simple device prevents the changing of size when the die is once set. An internal trip, adjustable for length of thread to be cut, is provided. Every part of the die is hardened and ground.

Globe Steel Tubes Co. has moved its Eastern district sales office to the Lincoln Building, 60 East 42nd Street, New York.

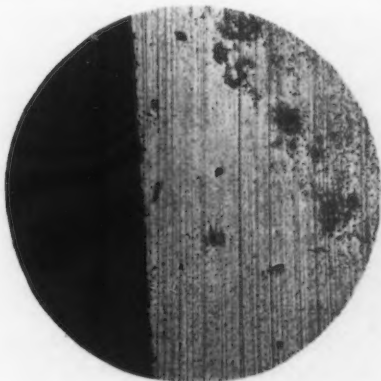


Fig. 1—Bright Finish Lapped Tungsten-Carbide Tool. (Reduced about half from original of 75 diameters)

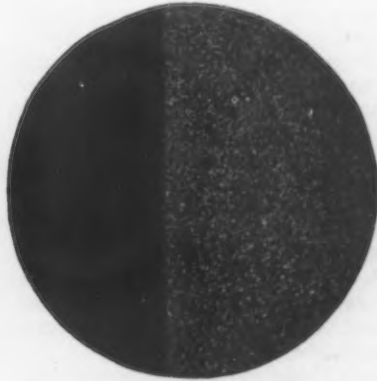


Fig. 2—Mat Finish Lapped Tungsten-Carbide Tool. (Reduced about half from original of 75 diameters)



## Large Gathering at Foundry Convention

Registration in First Two Days Was 3600, a Record Breaker—Sessions Well Attended

CLEVELAND, May 13.—A cherished desire of the management of the American Foundrymen's Association has been realized this week. It was the aim to make this year's annual gathering, the thirty-fourth convention and the twenty-third exhibition, the largest ever held. The exhibition at the Cleveland Auditorium exceeds in floor space, in diversity of displays and in number of exhibitors the former record made at the international meeting in Detroit in 1926. Prospects are that, with the registration of members, guests and exhibitors thus far today at over 3600, the attendance will surpass that of previous conventions. No two-day registration has equalled the one this year.

A fine technical program is being eagerly listened to by crowds. Over 350 attended the first shop operation course on gray iron yesterday, with about 450 at the gray iron metallurgy session this afternoon.

At the opening business session

yesterday afternoon, the selection by the board of directors of S. T. Johnson, S. Obermayer Co., Chicago, and past president of the association, as an honorary member was unanimously ratified. As president for the coming year, N. K. B. Patch, secretary, Lumen Bearing Co., Buffalo, was elected, and F. H. Ballard, general superintendent of foundries, General Electric Co., Lynn, Mass., was chosen vice-president.

Walter Seelbach, chairman of the Cleveland local committee, introduced John Marshall, mayor of the city, who offered the usual official welcome. A cablegram of greetings from the Institute of British Foundrymen was read. The meeting authorized the sending of similar greetings to all the foreign associations affiliated with the international body.

An important resolution was passed to investigate and promote foundry education in American engineering schools.

small distributing pipes, and low rate of flame propagation, promoting safety in use of gas.

Reheating and annealing furnaces at the plant of the A. O. Smith Corporation, Milwaukee, have been equipped for the fuel as has a large malleable annealing furnace at one of the large malleable casting companies in Michigan.

## British Steel Production Drops Sharply

LONDON, ENGLAND, May 13 (*By Cable*).—Production of pig iron in the United Kingdom in April amounted to 619,600 gross tons, and of steel ingots and castings 696,100 gross tons. These figures represent a recession from the output recorded for the previous months this year, the steel production being unusually low.

	Pig Iron	Steel
April, 1930 .....	619,600	696,100
March, 1930 .....	665,800	826,100
February, 1930 .....	597,000	776,400
January, 1930 .....	650,000	771,100
Monthly average, 1929..	631,600	800,600

## Contracts Awarded for Six Ships

The United Fruit Co. has placed orders with the Bethlehem Shipbuilding Corporation and the Newport News Shipbuilding & Dry Dock Co. for three ships each. The total cost will be about \$20,000,000. These ships are to be built under mail-carrying contracts with the United States Government. The new ships will be about 10,000 tons each.

## Management Association Holds Convention

Organization and operating principles, executive compensation and mergers were among the subjects discussed at the annual spring meeting of the American Management Association, held at the Hotel Astor, New York, May 12-14.

In addition to the six formal sessions, and several luncheon meetings, the convention featured a unique international dinner on the evening of May 13. During this dinner communications were exchanged by wireless, telephone and cable with several of the association's members in foreign countries. Addresses at the dinner centered around "Management and International Prosperity."

Sam A. Lewisohn, vice-president of the Miami Copper Co., was elected chairman of the board, and W. J. Graham, Equitable Life Assurance Society of the United States, was named president of the association. H. B. Gilmore, vice-president Western Electric Co., is treasurer. Vice-presidents in charge of the various divisions of the association are as follows:

A. H. Young, Industrial Relations Counselors, Inc.—programs and publication.

C. R. Cary, vice-president Leeds & Northrup Co.—industrial marketing.

I. D. Wolf, secretary Kaufmann Department Stores—consumer marketing.

Harvey Ellerd, department of personnel Armour & Co.—personnel.

T. R. Jones, vice-president Harris-Seybold-Potter Co.—production.

Cooke Lewis, vice-president Liberty Mutual Insurance Co.—office management.

J. C. Orcutt, vice-president Irving Trust Co.—financial.

Ernest Draper, Hills Brothers Co.—vice-president at large.

P. D. Betterley, assistant treasurer Graton & Knight Co.—insurance.

Membership in the association now numbers upward of 4300. Companies recently enrolling include the Lamson & Sessions Co., National Malleable & Steel Castings Co., Globe Machine & Stamping Co., Standard Tool Co., and the Surface Combustion Co.

## New Fuel for Industrial Furnaces

A new fuel for industrial heating has been introduced in several American plants. It is commercial butane which is a mixture of normal butane and iso-butane with small percentages of propane and the pentanes. It is produced by the Philfuels Co., Detroit, principally from natural gas in its petroleum fields in Oklahoma.

It is offered to the trade as a compressed liquid in tank cars. Delivered to the plant it is transferred, under suitable conditions, to storage tanks and from these it is released as a gas and applied by vaporizing burners to reheating furnaces, to heat-treating furnaces and for other purposes.

It has a calorific value of 3200 B.t.u. per cu. ft., or 21,420 B.t.u. per lb. Its latent heat of vaporization at the boiling point is 170 B.t.u. per lb., or 830 B.t.u. per gal. Its chemical symbol is C<sub>4</sub>H<sub>10</sub>. It is obtained from the casing-head gas which flows from oil wells and is liquefied to facilitate storage and shipment.

Some of the advantages emphasized are as follows:

Control of fuel supply, constant heat value, close temperature control,

## New Institute Director

At a meeting of the board of directors of the American Iron and Steel Institute in New York on May 5 Robert Gregg, president of the Atlantic Steel Co., Atlanta, Ga., was elected a member of the board to succeed Thomas K. Glenn of the same company, who recently resigned from the institute directorate.

## Electric Hoist Orders Gain

The members of the Electric Hoist Manufacturers Association report that the number of hoists ordered during April increased 7.4 per cent as compared with the previous month, and the value of such orders increased 9.9 per cent as compared with March, 1930.

Shipments were 11.5 per cent smaller in April than they were in March, 1930.

American Steel & Heavy Hardware Association will hold its twenty-first annual convention at the Edgewater Beach Hotel, Chicago, on May 20, 21 and 22.

# PERSONALS

FRANK PURNELL, president, Youngstown Sheet & Tube Co., Youngstown, is recovering from a minor operation performed last week at the North Side Unit, Youngstown Hospital.

JOHN LEYSHON has returned to his home at Farrell, Pa., from India, having completed his engagement with the Tinplate Co. of India of which he has been operating head for several years.

P. F. KOHLHAAS, of Perin & Marshall, consulting engineers, New York, has completed the blast furnace plant in Manchuria for which his firm was the engineer and is back at the home office.

W. N. TRUXELL, foundry engineer for the Potter Coal & Coke Co., Greensburg, Pa., is scheduled to speak on "Present Day Cupola Practice in American Foundries" at the regular monthly meeting of the Pittsburgh Foundrymen's Association to be held at the Fort Pitt Hotel, Pittsburgh, on May 19.

JOHN H. COGHLAN has been appointed direct representative in the New England States for the American Manganese Steel Co., Chicago Heights, Ill. His office will be at 92 Broadway, Cambridge, Mass.

G. LARUE MASTERS, sales manager of the National Lock Washer Co., Newark, N. J., has been elected vice-president in charge of sales. He became associated with the company in 1919 to take charge of car window equipment sales and was made assistant sales manager in 1927 and sales manager in 1929.

C. L. NEWBY, who has been identified with the Hyatt Roller Bearing Co., Harrison, N. J., since 1918, has been appointed manager of the Western division of the company, in Chicago.

ROBERT J. ANDERSON has resigned as vice-president and director of the Fairmont Aluminum Co., Fairmont, W. Va. His future plans are to be announced later.

CHARLES S. VOUGHT, who for several years has represented the Donner Steel Co., Buffalo, in New England, has joined the New York sales organization of the Bethlehem Steel Corporation and will have his headquarters at Hartford, Conn. Mr. Vought, prior to his connection with the Donner company, was with the American Steel Export Co. and before that with the Cambria Steel Co.

PAUL C. LEWIS, formerly with the Alloy Steel Products Co., Boston, has become associated with the sales department of the Globe Steel Tubes Co. at its New York office.



CHARLES M. WHITE, as announced in The Iron Age of May 8, has become assistant vice-president in charge of operations for the Republic Steel Corporation, with headquarters at Youngstown

OSCAR OLSON has resigned his position as vice-president and general manager of the Detroit Steel Corporation. He has been identified with the company for the past seven years and prior to that with the Columbia Steel Co., Elyria, Ohio. DEWEY OLSON also has resigned as superintendent of the company. No statements have been made as to their future plans.

E. B. HAZEN, president, Peoria Brass Foundry Co., Peoria, Ill., has been elected president of the People's Loan and Homestead Association, Peoria.

CHARLES E. HARTHAN, inventor, engineer and executive of the General Electric Co., Lynn, Mass., for the past 45 years, on May 15 was retired on pension. Mr. Harthan, who was born in Worcester, Mass., is a graduate of the Worcester Polytechnic Institute. He entered the employ of the Thomson-Houston Co. as a machinist, and was transferred to the model room within a year, where he worked under Prof. Elihu Thomson, and from that department worked into an executive position. During his connection with the General Elec-

tric Co. he has made more than 50 inventions and improvements in manufacturing processes, many of them of the highest importance.

E. H. DIX, JR., research metallurgist, Aluminum Co. of America, New Kensington, Pa., was scheduled to speak on "Light Alloys Used in Aircraft Construction" on May 13 before the Hartford chapter of the American Society for Steel Treating.

E. H. BOLLENBACHER has been appointed representative in the Atlanta, Ga., district, with offices at 725 Forsyth Building, for the Pennsylvania Pump & Compressor Co., Easton, Pa.

CLYDE C. WHIPPLE, assistant professor of electrical engineering at the Polytechnic Institute of Brooklyn, has been granted leave of absence for one year to serve as visiting professor in electrical engineering at the Green School of Engineering of Princeton University.

GEORGE H. KEMP, who has been affiliated with the Cleveland Varnish Co., Cleveland, for 17 years, as general representative, has been appointed industrial sales manager of the Ohio Varnish Co., Cleveland.

F. H. CHAPIN, president, National Acme Co., Cleveland, sailed for Europe, May 2, and will remain abroad until late in August. He will be joined in his travels a little later by GEORGE E. RANDLES, president, Foote-Burt Co., Cleveland, who plans to sail for Europe the latter part of the present month.

## Changes Occur in Leading Tin Brokerage Firm

Edward W. Starke, one of the leading tin brokers of New York, has announced his retirement from the firm of Caswell & Starke, Inc., with which he had been connected for 34 years. The business has been taken over by Walter D. Long, who becomes president and treasurer, and Alfred H. Byington, who is secretary. Mr. Long has been associated with the business for 25 years, having started as an office boy. Mr. Byington's connection covers 14 years.

The business will be conducted under the same name at 17 State Street, New York. Caswell & Starke, Inc., has for many years represented A. Strauss & Co., Ltd., London, one of the leading British tin houses.



## British Steelmakers Optimistic

### Believe Potential Demand for Metal Far Exceeds Existing Capacity of Plant

(Special Correspondence)

LONDON, May 2.—“Unemployment from which we are suffering is to a great extent due to the fact that our industries are not able to lay down plant necessary to keep their place in the world's competition,” said President Henry Louis at the annual meeting of the (British) Iron and Steel Institute. Further he characterized the industry as one of the most heavily taxed in the world. It found great difficulty in providing against obsolescence and the alterations brought with it, but it was not receiving proper consideration from those responsible for the national finance. Unless they could keep pace with their competitors in other countries they could not find employment for the millions of their industrial population.

Other speakers at the annual dinner were more optimistic. Sir Hugh Bell, past president, said that there was an inclination on the part of some people to imagine that the British iron and steel trades were at an end. That was far from being the case, and he did not consider that there was any need to be afraid of the future.

An appraisal of the world's consuming ability in relation to the existing capacity of steel plant was made by Dr. Eugène Schneider, head of the Creusot Works in France. If progress was measured by production, he saw that world production of steel had reached 119,000,000 tons in 1929, an increase of 60 per cent above the figures of 1913. It is evident that one is witnessing an economic revival, the importance of which it would be childish to deny, and it is not unreasonable to presume

that the world's potential demand is above the production figure of 1929.

Sir W. Peter Rylands, president, National Federation of Iron and Steel Manufacturers, also said that there appeared to be no limit to possible developments in the use of iron and steel. Experience in the past would seem to suggest that the world's consumption of steel might reach during the next 20 years a figure of stupendous magnitude. In Britain steelmakers are full of optimism.

Prof. Henry Louis was reelected president of the institute. Bessemer medals were awarded to Dr. Eugène Schneider, Paris, France, and to Dr. Walter Rosenhain, National Physical Laboratory, Teddington, England.

Some dozen papers were read and discussed at the open meetings; abstracts of the more important ones will be printed in later issues of THE IRON AGE.

and authoritative data on physical characteristics and proper usage of all grades and forms of steel manufactured by the corporation companies, together with information as to their adaptability for respective proper usage.

Trade research problems, through the organization of the central bureau, will receive the benefit of the combined cumulative experience of more than a score of special corporation committees especially concerned with technical and manufacturing subjects. The bureau, by assembling and exchanging information received from all channels, will collaborate in introducing and promoting new uses of existing products and more extensive employment of steel for all purposes.

It will be recognized, it is stated, that this bureau is a natural outgrowth of the work of the manufacturing companies of the corporation during years of systematic experimentation and practical tests, which have contributed so largely to progress in the manufacture of steel products and the diversification of ultimate use.

## Obituary

EDWARD P. LOGAN, one of the founders and for 60 years treasurer of the Klein-Logan Co., South Thirteenth Street, Pittsburgh, maker of small tools, died at his home in a Pittsburgh suburb on May 3, in his eighty-third year. He was born in North Side, Pittsburgh, and had served his company continuously until his retirement in January.

FREDERICK T. JONES, Cleveland district sales manager of the Johns-Manville Corporation, died May 8, aged 61 years. He had been connected with the company in Cleveland 17 years.

J. V. HURD, vice-president and secretary and a director of the Monongahela Tube Co., Pittsburgh, was instantly killed in an automobile accident near Wilmington, N. C., on May 7. Mr. Hurd, who was a son of the late W. L. Hurd, one of the organizers and for many years president of the Monongahela company, had been identified with the organization since 1901. He was made secretary in 1905, and later vice-president. For the last two years the younger Mr. Hurd had been less active in the affairs of the company, having divided his time between Pittsburgh and Pinehurst, N. C.

JAMES ARTHUR, founder and former president of the Arthur Machine Works, Brooklyn, N. Y., died at Winsted, Conn., on April 27.

CARL P. SEYLER, president Seyler Mfg. Co., Pittsburgh, died at his home at Glenshaw, Pa., on May 2, aged 64 years.

### Corporation Establishes Trade Research Bureau

The United States Steel Corporation has established a trade research bureau of its subsidiary manufacturing companies, with C. O. Hadly as its secretary, in the Frick Building, Pittsburgh. Trade research and development work of these manufacturing companies during many years has reached out into every field where ferrous metals serve industry. Several of the companies, although not members, have collaborated in the research work of the National Association of Flat Rolled Steel Manufacturers and the American Institute of Steel Construction. Through the exchange of useful information among committees formed in each of the manufacturing companies, the bureau will afford a medium for effective collaboration with the commercial activities of customers individually or as represented by other trade research organizations, it is announced.

The motive and scope of such investigative work looks to expanding the present use and to explore the prospects of increased usage and more extended demand for new and improved steel products, recognizing

the practical fact that increased consumption through such channels increases tonnage consumed by the whole industry and benefits all concerned.

Intelligent interest and investigation into the purposes for which material is required, the methods of its usage, when such inquiry and attention are acceptable to the customer or consumer, result in exchange of information mutually valuable. The new bureau, correlating the activities of the trade committees of the individual subsidiary companies so far as applicable to consumer usage of steel, will assist the collating, examination and application of such information for the benefit of customers, and to a certain extent minimize duplication of effort and systematize the details of the methods employed.

Within the past several years many so-called innovations in the manufacture of steel products have been offered to the trade with pretensions of superiority, the announcement says. The corporation companies, either through their respective trade research committees or through the central bureau, will be in position to supply consumers with authentic

## B. F. Fairless New Head of Union Drawn Steel Co.

At a special meeting on Monday of the board of directors of the Union Drawn Steel Co., Beaver Falls, Pa., subsidiary of the Republic Steel Corporation, the resignation of E. S. Hoopes, president and general manager, was accepted and B. F. Fairless, first vice-president of the Republic Steel Corporation, was elected president. J. U. Anderson, treasurer of the Republic Steel Corporation, was named on the board of directors to succeed the late E. T. McCleary.

Officers of the company, in addition to Mr. Fairless, are H. T. Gilbert, vice-president; E. C. Rebeske, secretary and treasurer; J. Paul Mosley, assistant secretary and treasurer; George B. Mitchell, vice-president in charge of sales, and L. E. Creighton, vice-president in charge of operations.

Directors of the company, in addition to Mr. Fairless and Mr. Anderson, are R. J. Wysor, vice-president in charge of operations of the Republic Steel Corporation; H. T. Gilbert, vice-president in charge of sales of Republic; W. B. Ohl, comptroller of Republic; George Davidson, Beaver Falls; and Mr. Creighton.

President Fairless announced that the company's plants and offices would be maintained as previously, with the exception of the sales offices, which will be moved to Youngstown in order to better coordinate their sales efforts with those of the Republic Steel Corporation. The company has plants at Beaver Falls; Massillon, Ohio; Gary, Ind., and Hartford, Conn.

## Republic Appoints District Sales Managers

William Vosmer has been appointed sales manager of the bar division of the Republic Steel Corporation, with headquarters in Youngstown. He was formerly vice-president in charge of sales of the Donner Steel Co. L. D. Mercer, formerly in charge of sheet sales of the Central Alloy Steel Corporation, has been appointed sales manager of the sheet division and will supervise all classes of sheet sales. Appointments of district sales managers have been announced by H. T. Gilbert, vice-president in charge of sales.

In the New York district W. H. Oliver, formerly district sales manager for the Republic Iron & Steel Co., becomes district sales manager for the new corporation, with offices in the Lincoln Building. A. W. Minuse, formerly manager for the Central Alloy company, and P. M. Guba, former New York representative for the Donner Steel Co., become assistant district sales managers.

In the Philadelphia district C. F. McKinley, former Republic manager, has been named district sales manager and S. H. Truitt, former Central Alloy Steel Corporation sales

manager, becomes assistant district sales manager. The company's office will be located in the Fidelity Philadelphia Building about June 1.

T. B. Davies, former sales manager for the Central Alloy company, with headquarters at Syracuse, becomes district sales manager at Buffalo. R. V. Jones, former district sales manager of the Republic Iron & Steel Co., has been appointed assistant sales manager at Buffalo.

As announced last week, W. E. Collier, the former Republic district manager in Cleveland, has been re-appointed and F. L. Gibbons, formerly sales manager, Central Alloy Steel Corporation, has been named as his assistant.

## Phoenix Mfg. Co. Buys Graver Corporation

The Phoenix Mfg. Co., Joliet, Ill., has purchased from the Graver Corporation its steel tank, water treating and steel plate construction business, including the Graver plant at East Chicago, Ind. The new company will operate this plant and business under a wholly owned subsidiary company to be known as the Graver Tank & Mfg. Corporation.

The Graver Corporation has been engaged in the fabrication of tanks and other steel plate construction for more than 50 years. The Graver brothers will become a part of the executive personnel of the new Phoenix subsidiary. The officers are as follows: President, Edward N. Gosselin; vice-president and general manager, F. C. Everitt; secretary and treasurer, R. E. Meyer; vice-president in charge of sales, P. S. Graver; vice-president, W. F. Graver; vice-president, H. S. Graver.

The Phoenix Mfg. Co. has three plants, not including the newly acquired Graver plant, with capacity of over 30,000 tons of iron and steel products a year. These plants are located at Joliet, Ill., Catasauqua, Pa., and Montreal, Que. The Phoenix company manufactures horse shoes, commercial forgings and rubber products.

## New York Scrap Chapter Elects New Officers

The New York Chapter of the Institute of Scrap Iron & Steel, Inc., elected the following new officers on May 6: President, J. L. Spitzer, Schiavone-Bonomo Corporation, New York; first vice-president, Charles J. MacIntosh, Perry, Buxton, Doane Co., Hartford, Conn.; second vice-president, Al Gerson, Harlem Metal Co., New York; third vice-president, George Kasden, H. Kasden & Son, New Haven, Conn.; treasurer, Louis Fisher, Fisher Brothers Scrap Iron & Steel Co., New York; secretary, Frank Fry, Hausman & Wimmer Co., New York.

## Steel and Scrap Leaders Confer on Problems

The special committees of the American Iron and Steel Institute and the Institute of Scrap Iron and Steel, appointed to discuss the problems of the scrap industry as they affect the steel industry, met in a two-hour discussion at the Commodore Hotel in New York Friday afternoon, May 9. Those who attended were James A. Farrell, president, United States Steel Corporation, chairman; Eugene G. Grace, president, Bethlehem Steel Corporation, and L. E. Block, chairman, Inland Steel Co., representing the American Iron and Steel Institute, and Benjamin Schwartz, director general, and Samuel N. Summer, president of the Scrap institute, and Phil W. Frieder, chairman, executive committee of the Scrap institute.

After Mr. Schwartz outlined the problems of the scrap industry, a great number of questions were asked, in which every member of the committees participated. Particular emphasis was laid on reciprocal arrangements in the sale of finished steel involving scrap purchases and the purchase of unprepared scrap by steel mills for preparation at their own plants.

Mr. Farrell requested Mr. Schwartz to prepare a brief on the points discussed and he stated that he would call his committee together in the near future to discuss the brief and prepare a report. Mr. Farrell, Mr. Grace and Mr. Block undertook to constitute themselves as a standing or continuing committee to confer with the Institute of Scrap Iron and Steel from time to time on problems of mutual concern.

## Busy Day Arranged for Steel Treaters

Four chapters of the American Society for Steel Treating, namely, Philadelphia, Lehigh Valley, New York and New Jersey, which held a successful joint meeting at Bethlehem, Pa., last year, will again meet on May 23, this time in New Jersey. In the morning the Western Electric Co. plant at Kearny, N. J., will be inspected under the general direction of J. B. Mudge, the metallurgist, and in the afternoon a similar visitation of the Wright Aeronautical Corporation plant at Paterson, N. J., will be supervised by R. R. Moore, metallurgist for the latter organization.

In the evening, President Guthrie, Secretary Eisenman, and seven other officers and directors of the national society will be guests of the members at the Elks Club, Newark, N. J. F. F. Lucas of Bell Telephone Laboratories, New York, will give a coffee talk on "My Impressions of Japan," while H. C. Kneer, president, Metallurgical Laboratories, Philadelphia, will give a technical discussion of aircraft metallurgy.



W. W. MACON  
Editor

# THE IRON AGE

A. I. FINDLEY  
Editor Emeritus

ESTABLISHED 1855

## Big Business and Lesser Business

"TO merge or not to merge" is no longer the question in the opinion of James A. Farrell, who paraphrased the famous passage from "Hamlet" in addressing the American Iron and Steel Institute last Friday. And he added that "the bloom is off the rose in the merger business." President Schwab evidently regarded these remarks as a personal thrust and appropriately pointed out that he is differently situated from Mr. Farrell and that the United States Steel Corporation "can't merge any more."

Yet it is improbable that Mr. Farrell had any particular consolidation in mind and, further, it is unlikely that his view differs materially from Mr. Schwab's.

Evidences of disagreement at the institute meeting may well have been more apparent than real, particularly when the contrast in the temperament and experience of the two men is taken into account. Mr. Schwab himself conceded that bigness is not itself a virtue and that in each case a consolidation must be economically justifiable. Moreover, he emphasized the prime importance of personnel, saying that "fundamentally business is the product of the individuals who constitute it."

Undoubtedly Mr. Schwab has more enthusiasm for mergers than his contemporary. For his work in putting together the United States Steel Corporation, the greatest steel company in the world, and his subsequent welding together of the Bethlehem Steel Corporation, the second largest steel producer in America, Mr. Schwab will go down in history as a master builder.

Mr. Farrell's experience has been different. It was his task to take over the vast organization that others had created and to make it work. While the late Judge Gary was doing a superlative job of interpreting the corporation and of making it more acceptable to the public, Mr. Farrell had the equally difficult task of tying up the loose ends and ironing out the wrinkles in a mammoth fabric. The heavy burden of interminable detail, the winning of markets abroad and at home—in short, the responsibility of earning dividends—fell to a large extent on his shoulders. These trying experiences no doubt magnified, in his eyes, some of the shortcomings of mergers, some of the disadvantages of bigness.

His stewardship of so large a corporation, if we reason rightly, has also quickened his appreciation of all factors that make for sound prosperity. With a business that reaches not only all parts of this country, but all quarters of the globe, the Steel Corporation must necessarily favor all policies that bring the great-

est good to the greatest number. It cannot hope for profit from a narrow selfishness.

With an eye to the rapidly expanding miscellaneous uses for steel, Mr. Farrell is naturally concerned about preserving freedom for individual initiative and ample opportunity for new companies—small companies—to get a start and to grow. Similarly his attitude on the tariff reflects a conception in keeping with the large stake of his great company—a continued expansion in trade both within and beyond our boundaries. His concern over the maintenance of wage scales mirrors an appreciation of the fundamental importance of preserving the power of the masses to buy consumer goods in which steel is entering to a larger and larger extent.

His criticism of call loan profits and his comment that a "check on luxuries and other things not permanent is helpful" indicate what a high value far-seeing industrial executives place on the homely virtues of hard work and thrift that the sudden ending of the "new era" restored to a high place in popular esteem. Mr. Farrell's address, in a word, demonstrated that a master of markets is a friend of true prosperity.

## New Uses for Steel

THE United States Steel Corporation announces the establishment of a trade research bureau, with headquarters at Pittsburgh, to coordinate the work of the various subsidiary companies in cultivating new uses for steel and expanding old uses. This bureau, in the commercial field, admirably complements the corporation's department of research and technology, formally initiated in April, 1927.

The need for technical and trade research to enlarge the use of steel has long been stressed in these columns. Association activities along these lines are steadily becoming broader in scope and more effective, and the attitude of the individual manufacturer toward research is growing more sympathetic.

Steel manufacturers are changing their views on the market problems of the industry, if recent addresses before the American Iron and Steel Institute are a criterion. President Schwab characterized competition as a necessity—the "bottle fly" that had driven the steel industry to its present position. Pleas for price stabilization through amendment of statutes or cooperation with the Department of Justice, entreaties for "enlightened" competition or for a "moratorium" on plant construction were conspicuous by their absence. On the other hand, emphasis was placed on finding more and larger outlets for steel. Mr. Schwab's faith in the ability of the industry to widen

its market was indicated when he predicted that much of the 7 per cent increase in ingot capacity this year would be employed in supplying the needs created by extending the use of steel into new fields.

### Opposite Results of Efficiency

THE prosperity we have enjoyed in the last seven years has been due largely to increasing efficiency, and a portion of the present adversity is due to the progress of efficiency. What the proportion is cannot be measured by our present methods, but a subject is presented which ought to be studied, for something can be learned.

It will be granted that a country which goes on doing things exactly in the old way will not continue in its prosperity. Things must be done or made better in quality and more cheaply. Thereby, for a given volume, labor is released and in some cases capital also, while in other cases more capital per unit may be required. Slack thus brought about may be taken up by increased demand on account of the higher quality and lower cost, and by new commodities and forms of service being developed, which require labor and capital.

The balance or lack of balance between these two things, the release of productive ability in one direction and its absorption in another, is a large influence in determining the amount of prosperity from time to time. There are other influences, and if we could measure the relative importance of the various influences we should know a great deal more than we do, and could plan for the future much better, as individuals, as corporations and as divisions of government.

Very long ago efficiency began to increase—we need not bother about the exact time. The advent of the steam engine is not a bad time to select for the beginning. It might be asked, why worry, when people have gone along so well to date? The reason for study is that the two opposing influences we here refer to may have chanced to be in balance most of the time, but to get out of balance occasionally, and just now may be one of those unbalanced times. The balance seems to be natural, for when men are active, energetic and sanguine they are likely to work along both lines, to do old things better and to start doing new things.

To some it has seemed that the trouble just now is that progress in efficiency has been too rapid, leaving not enough time for adjustment. At a glance it may seem that way, but a careful study over a long period of time would raise much doubt. Some of the improvements made throughout the nineteenth century were really revolutionary in character. Perhaps some of the changes thus far in this century may be called revolutionary also, but to cite examples is merely to encourage distortion of the picture.

What we really need is a weighted average of all progress, i.e., take each line of endeavor and measure it, say, by the proportion of the total labor employment it accounts for, giving a factor of relative employment; then measure the rate of reduction in man-hours it effects, as the second factor. The sums of the quotients from time to time would enable us to make a trustworthy comparison of the general

rate of progress in the distant past and the recent past.

Our progress in efficiency may not have been so much more rapid in the last few years than it was long ago, but it may be that the wants of the people have not been increasing fast enough. In a relatively short space of time they have been given canned goods, automobiles and radio. What else can they want? Perhaps there is something in the idea of shortening the hours of labor. That would kill two birds with one stone, representing both an efficient form of "ca' canny" to maintain employment, and a way of encouraging people to want more things by giving them more leisure. But the whole matter should rest upon further and more detailed study.

### The Unfilled Tonnage Barometer

WALL STREET'S advance guesses last week on the Steel Corporation's unfilled tonnage statement published May 10 illustrated again how much greater barometric significance may be given these figures than actually attaches to them. For years a gain in unfilled orders has been construed as favorable, while a decline has been taken to show that the steel trade is not doing so well. But last week, we are told, some of the prophets of the street were pointing out a few days before the 10th that "fewer orders [in April] might be offset by decreased shipments, which might even make the unfilled total show an increase"! That is, even if April bookings had been, let us say, 300,000 tons less than those of March, and shipments in April had fallen off, say, 400,000 tons, and a gain of 100,000 tons had been reported, the statement would have been taken as showing a favorable trend in the steel industry.

As we have often pointed out, quite too much importance has been attached to the unfilled tonnage figures. Except, perhaps, in periods of manifestly expanding demand or on the other hand of plainly indicated reaction, these statistics are likely to be misinterpreted unless accompanied by full facts as to operating rates in the month, sources and volume of new orders and specifications, and amount of cancellations. Such details, as is well known, have never been supplied for publication.

### Increases in Steel Capacity

A FORTNIGHT ago, on the red bordered page of THE IRON AGE, there was a succinct presentation of the course of steel capacity and steel production over a period of ten years. Since then the American Iron and Steel Institute has issued its annual compilation of steel ingot capacity, for Dec. 31, 1929, the fifth compilation by a uniform system, eliminating idle capacity and requiring producers to show that they really could produce as they report. Thus a precise comparison can be made of growth in four separate years, increases being as follows:

	Per Cent
1926 .....	3.9
1927 .....	2.5
1928 .....	3.9
1929 .....	2.2

The increase during the whole four-year period is 12.9 per cent, to 63,067,549 tons at the beginning of



this year. This is two-thirds of one per cent under the estimate made in this department of THE IRON AGE of Jan. 16, an estimate of 67,000,000 tons being made at the same time for Jan. 1, 1931.

One cannot generalize with confidence from a showing including only four years, as in the table above, but it does seem a trifle curious that the two years of smallest increase in the last four were 1927, an off year, and 1929, a record year by a large margin. Last year's small growth may have been due in large measure to mills being so busy, new construction frequently involving the temporary idleness of a department, or its abandonment to make way for the new equipment. At any rate, there is the fact that our annual compilation, published Jan. 2, 1930, showed new open-hearth construction projected for 1930 at 1,830,000 tons by independents and 2,860,000 tons by the Steel Corporation, making a total of 4,690,000 tons, and the program has been somewhat increased since then. For the three preceding years the Steel Corporation had reported no new units at all.

Capacity as reported is effective capacity. Bessemer production last year was 83 per cent of capacity re-

ported at both ends of the year, there being an increase of a few thousand tons in reported capacity. That was doing very well in a year that ran so to automobile and structural steel and in which there was a slump in general demand in the late months.

Taking capacity for each year as the mean between the beginning and end, production relative to capacity has been as follows:

	Per Cent
1926 .....	82.5
1927 .....	74.6
1928 .....	83.0
1929 .....	87.6

In general these are high averages, considering the fluctuations in demand in different portions of the year and the fact that buyers insist on getting deliveries when they want them. It is through no fault of the steel makers that production varies so widely in a year. If sellers have been criticized, it has been for making undue efforts to develop orders when buyers do not want to place orders. In 1926 the low month in production was nearly 20 per cent below the high month; in 1927 it was 28 per cent; in 1928, 12 per cent, and in 1929, no less than 41 per cent.

## CORRESPONDENCE

### Economic Field of Cast Iron

*To the Editor:* In your issue of May 1 is an article by O. W. Potter under the heading "Cast Iron Refuses to Step Aside," the gist of which is that cast iron is a very valuable metal. This no one doubts.

Three statements are made which are misleading, however. The first is that because of the great compressive strength cast iron is of greater utility than steel for the manufacture of bases.

The second misleading statement is that cast iron will withstand shock in a way which is very much better than had been previously supposed.

A third point is that special grades of cast iron have very high tensile strength and therefore great utility.

It is, of course, always an easy matter to take conditions as they should be, or as we hope they would be and prove almost anything true. It would not be difficult to prove that standing armies are of no use if everyone would obey the Golden Rule. However, people do not obey the Golden Rule. In the same way it is beside the point for us to consider what might happen if all foundries manufactured cast iron which had very much better characteristics than the usual cast iron now made, since we must take the actual conditions as they exist and shape our course accordingly.

Looking at the matter in this way it is evident, therefore, that the greater compressive strength of cast iron helps but very little in the manufacture of bases. It is self-evident that in any useful base certain parts of the members must be in tension; the low tensile strength of cast iron limits the loading and therefore determines the size of the section in spite of the fact that the compressive strength may be beyond the possible loading.

In the second place while it is perhaps true that special grades of cast iron will withstand shock, still the factors of safety which are allowed and which in general custom are used, are at least twice as high for cast iron as for steel. These factors of safety are determined not by

anyone who has a special grudge against cast iron, but because experience has shown that it is necessary to handicap cast iron in this way in order to make it safe.

As to the third point: It is undoubtedly possible to make cast iron of high tensile strength. However, experience has shown that if a higher strength than 15,000 lb. per sq. in. in tension is used, dangerous results are encountered. Therefore, this figure must and will continue in use as long as conditions remain as they are.

The greatest handicap that cast iron has is the fact that it must be made with patterns, cores, and in foundries where the cost must of necessity be very high. It is its high cost, figured on the basis of strength, weight or necessary section, that determines its utility. As soon as cast iron can meet steel in competition on the basis of cost of finished product, all costs included, then its field will remain constant. However, under present conditions its handicap is great enough so that its field is narrowing and must continue to do so as long as the economic factors now existing continue.

Cleveland,

J. F. LINCOLN,

President, Lincoln Electric Co.

### Chromium and Copper Improve Structural Steel

ANOTHER contribution to the information available on high-strength structural steel has been made by J. A. Jones, research department, Woolwich Arsenal, England, to the (British) Iron and Steel Institute in a paper entitled "Chromium-Copper Structural Steels." In a communication to the same body in 1929 he stated that the best tensile properties could be had in a steel containing C 0.3, Mn 1.3, Si 0.9, but that steels with such high silicon had a decided tendency to be seamy. This defect was absent in certain German steels containing less carbon and silicon, but with chromium and copper each about 0.5 per cent.

A number of low-silicon steels of the latter type were made in crucibles, rolled into bars and plates and tested in the normalized and slowly cooled condition. Best properties were obtained in the steel analyzing C 0.30, Si 0.07, Mn 0.5, Cr 0.9, Cu 1.2, much superior to those of the medium manganese steel, equal to the best manganese-silicon

## The Week in Business

### Drift of Current Financial and Economic Opinion

CONGRESSIONAL elections, set for next autumn and in some quarters looked for to provide a "partial political turnover," have come into the picture within a week as a major factor influencing business. *Analyst* says that the political element cannot be left out of account until November is past—or even later. *Commerce and Finance* lays the present quietude in part to the looming political horizon.

That no betterment in business conditions is revealed by the latest trade indicators is the conclusion of Alexander Hamilton Institute, which says that they "present a less favorable picture than those of a week ago." But one commentator points to the fact that many comparisons are made against the swollen records of last year, and hence show losses around 20 per cent, whereas the general decline below the line of normal activity may be regarded as more nearly 8 per cent.

However this phase may be viewed, most observers are of the opinion that a long pull is ahead of us, before any marked improvement can be recorded. The Union Trust Co., Cleveland, holds that the business organism "depends for stimulus upon retail sales, which will not pick up substantially until people who have been unemployed for protracted periods obtain work. . . . As retail trade increases, we may look forward to a speeding up of industrial schedules, which will result in increased traffic."

This point is stressed by United Business Service, which does not expect appreciable betterment "until commodity prices and purchasing power improve. . . . The beneficial effect of favorable credit conditions cannot be considered except from a long-term viewpoint. In the meantime, a rather lazy improvement in employment, retail trade, and in the automobile and building industries is possible."

March was the low month, according to National Industrial Conference Board, although April

showed slight improvement. "It is too early yet to say that we have turned the corner. . . . The impression is left that recovery from our present position on the business curve is likely to be slow."

Against the LaSalle statement that "optimism remains undimmed, that the new work and new forces released by spring will prove all that are needed to head business definitely upward" must be set the Silberling warning that several industries are yet to feel the full influence of the declining cyclical movement. Among those mentioned are electrical equipment, railroad equipment, machine tools, silk and "steel manufactures." That organization looks also for some further reaction in automobile output and in certain lines of building.

Commodity prices have followed a course which, according to *Analyst*, "offers scanty prospect of such stabilization as some hopeful commentators on business conditions thought had made its appearance some weeks ago."

structural steel previously examined, and superior to all in corrosion resistance. The new steel is less sensitive to variations in the rate of cooling after normalizing (or on the hot bed after a controlled temperature at the finishing pass). Comparative properties follow:

	Ordinary Structural Steel	Medium Manganese Steel	Manganese Silicon Steel	Chromium Copper Steel
Chemical composition				
Carbon .....	0.18	0.31	0.33	0.31
Silicon .....	...	...	1.10	0.07
Manganese .....	0.36	1.57	0.94	0.46
Chromium .....	...	...	...	0.88
Copper .....	...	...	...	1.17
Heat treatment .....	As rolled	As rolled	Normalized	Normalized
Tensile properties				
Proportional limit..	18,000	45,000	54,000	52,000
Yield .....	32,000	54,000	62,000	63,000
Ultimate strength..	62,000	89,000	100,000	92,000
Elongation in 2 in.	33	34	29	31
Reduction of area..	61	66	58	61
Brinell hardness ....	120	175	193	182
Izod impact .....	73	60	43	55

### Proper Temperature for Forging

IT is well known that heating prior to forging is frequently done at too high a temperature. To discover whether it is advantageous to employ temperatures below those usually employed a series of experiments were made by E. Decherf and described in the November, 1929, issue of *Aciers Spéciaux, Métaux et Alliages*. The composition of the steel chosen for the experiments was: C 0.12, Mn 0.30, Cr 0.5, Ni 3.10, S 0.025, P 0.025. Half of the test-pieces were heated in 20 min. to 1000 deg. C., and the other half to 1100 before being placed under the steam hammer. The pieces were forged rapidly into small cranks, the temperature dropping about 50 deg. C. during the operation.

Tests on the forged pieces showed that no difference in Brinell hardness was caused by this difference in forging temperature. Below the surface there was a slight variation in hardness, but it was similar in both cases. When sectioned and pickled in hydrochloric acid the orientation of the fibers was found to be more marked in the pieces hammered at the lower temperature; when broken the fracture was less crystalline, and the Charpy impact value was about 6 per cent greater. Microphotographs show a marked orientation of the pearlite in parallel bands when forged at the lower temperature, while in those worked at 1100 deg. C. the pearlite was unequally distributed, the grains of ferrite were large and irregular, and the general structure was heterogeneous.

Rough forgings were then raised to 1100 and 1200 deg. in an oil furnace, and drop forged to a finished lug. Microphotographs show a lack of homogeneity in the ferrite and pearlite regions at 1200 deg., the ferrite being predominant and of irregular formation. The Brinell tests were identical after re-forging at both temperatures, but after 1100 deg. the general structure was smaller and finer, the fracture was less crystalline, and the piece was tougher.

These tests lead to the conclusion that 1000 deg. C. is preferable for rough forging, that drop forging may be effected at 1100 deg. without detriment to the metal, and that generally these temperatures, somewhat lower than usually recommended, are satisfactory.

Other tests which dealt with the difficulties encountered in the regeneration by heat treatment of metal which has been forged at unsuitable temperatures, showed that the soaking at heat before quenching had to be increased by 75 per cent, which is too expensive in fuel and labor.



# Iron and Steel Markets

## Prices Give Further Ground

Declines Reported in Scrap, Furnace Coke, Pig Iron,  
Galvanized Sheets, Bolts, Nuts and Rivets—  
Ingot Output Recedes to 75 Per Cent

**I**N a market characterized by price weakness, intermittent specifications, fluctuating mill operations and apathetic buying, raw steel output has declined from 77 to 75 per cent of capacity. The Steel Corporation rate remains at close to 80 per cent, but curtailment by independents has brought down the general average.

A further slight gain in releases from the automobile industry, improvement in fabricated structural steel awards, increasing demand for line pipe, a growing volume of civil engineering work and sizable contracts for ships and barges are favorable developments. On the other hand, railroad equipment orders are light, rail mill backlogs are steadily being reduced, tin plate output has receded to a 75 per cent rate and production of farm implements shows signs of tapering.

Prices have given further ground, with declines reported among all classes of products from finished steel to scrap and coke. Old material markets are uniformly sluggish or weak, and heavy melting scrap has receded 25c. a ton at Pittsburgh, Chicago, Cleveland and Cincinnati and 50c. a ton at St. Louis.

Foundry pig iron is off 50c. a ton at eastern Pennsylvania furnaces and has been marked down an equal amount by Cleveland producers for outside shipment. All grades of silvery pig iron are \$1 a ton lower except for 7 per cent material, which is off 50c., and 6 per cent grade, the minimum price of which is unchanged.

Beehive furnace coke has declined 10c. a ton to \$2.50, Connellsville.

Finished products that have undergone price reductions include galvanized sheets, fender stock, large rivets and bolts and nuts. Galvanized sheets and fender stock have declined \$2 a ton to 3.20c. and 3.80c. a lb. respectively. The discount on bolts and nuts has been increased to 73 per cent, a price recession of 10 per cent, and large rivets have been marked down \$4 a ton to \$2.90 per 100 lb. Plates and shapes, which recently declined to 1.75c. a lb., Pittsburgh, are not strong at that figure, concessions to 1.70c. having been made in certain markets. Automobile body sheets lack strength at 3.80c., Pittsburgh.

Orders for steel pipe placed by the Sun Oil Co. for

a gasoline line from Philadelphia to Cleveland now total 20,000 tons. Several hundred thousand tons of large-diameter line pipe are expected to be placed within the next few months. The Columbia Gas & Electric Corporation plans to lay a 400-mile 24-in. gas line from West Virginia to Washington and Baltimore, and the Phillips Petroleum Co. will build a 350-mile gasoline line from Texas to Kansas City.

These and other projects, together with contracts already placed, account for the recent prediction of President Farrell of the Steel Corporation that pipe mills will soon be fully booked until the end of the year. While the outlook in line pipe is favorable, demand for other forms of steel pipe remains quiet. Consumption of standard pipe is estimated at 20 per cent below that of last year.

Fabricated structural steel awards, at 43,000 tons, are the largest since February and far above the recent average, although approached two weeks ago, when the total was 42,000 tons. Reinforcing bar business is well sustained by public works projects, and lettings, at 12,000 tons, compare with the high total of 16,000 tons a week ago.

Six 10,000-ton mail contract vessels have been placed by the United Fruit Co., three with the Bethlehem Shipbuilding Corporation and an equal number with the Newport News Shipbuilding & Drydock Co. The Mississippi Valley Barge Co. has awarded fifty 300-ton steel barges to the Dravo Contracting Co., Pittsburgh.

In contrast with price developments in the iron and steel market, copper has shown an impressive recovery. After dropping from 18c. to 14c., Connecticut valley, and then dipping 1½c. to 2c. further, it has advanced on heavy sales to a fairly strong position at 13c. Domestic purchases in the past seven days are estimated at 75,000 to 100,000 tons, while export business amounted to 45,000 tons. Much of the metal sold is for delivery in the next three months, although certain buyers covered their needs until the end of September.

A decline of 50c. a ton at Philadelphia brings THE IRON AGE composite pig iron price down to \$17.58 a gross ton, the lowest figure since July, 1928. Last week it stood at \$17.67. The finished steel composite is unchanged at 2.228c. a lb.

# A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,  
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	May 13, 1930	May 6, 1930	Apr. 15, 1930	May 14, 1929
No. 2 fdy., Philadelphia.....	\$19.76	\$20.26	\$20.26	\$21.76
No. 2, Valley furnace.....	18.50	18.50	18.50	18.50
No. 2 Southern, Cin'ti.....	16.69	16.69	16.69	18.69
No. 2, Birmingham.....	14.00	14.00	14.00	15.00
No. 2 foundry, Chicago.....	19.00	19.00	19.50	20.00
Basic, del'd eastern Pa.....	18.75	18.75	19.00	20.25
Basic, Valley furnace.....	18.50	18.50	18.50	18.50
Valley Bessemer, del'd P'gh..	20.76	20.76	20.76	20.76
Malleable, Chicago.....	19.00	19.00	19.50	20.00
Malleable, Valley.....	19.00	19.00	19.00	19.00
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	94.00	94.00	94.00	105.00

Rails, Billets, Etc., Per Gross Ton:	May 13, 1930	May 6, 1930	Apr. 15, 1930	May 14, 1929
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Re-rolling billets, Pittsburgh..	33.00	33.00	33.00	36.00
Sheet bars, Pittsburgh.....	33.00	33.00	33.00	36.00
Slabs, Pittsburgh.....	33.00	33.00	33.00	36.00
Forging billets, Pittsburgh.....	38.00	38.00	38.00	41.00
Wire rods, Pittsburgh.....	36.00	36.00	38.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, 1b....	1.80	1.80	1.85	1.85

Finished Steel,	May 13, 1930	May 6, 1930	Apr. 15, 1930	May 14, 1929
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.75	1.75	1.80	1.95
Bars, Chicago.....	1.85	1.85	1.90	2.05
Bars, Cleveland.....	1.75	1.80	1.80	1.95
Bars, New York.....	2.09	2.09	2.14	2.29
Tank plates, Pittsburgh.....	1.75	1.75	1.80	1.95
Tank plates, Chicago.....	1.85	1.85	1.90	2.05
Tank plates, New York.....	1.97 1/2	2.02 1/2	2.02 1/2	2.22 1/2
Structural shapes, Pittsburgh..	1.75	1.75	1.80	1.95
Structural shapes, Chicago...	1.85	1.85	1.90	2.05
Structural shapes, New York...	1.94 1/2	1.94 1/2	1.99 1/2	2.19 1/2
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.30
Hot-rolled strips, Pittsburgh..	1.70	1.70	1.70	1.90
Cold-rolled strips, Pittsburgh..	2.55	2.55	2.55	2.75

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel,	May 13, 1930	May 6, 1930	Apr. 15, 1930	May 14, 1929
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh...	2.55	2.55	2.55	2.85
Sheets, black, No. 24, Chicago	2.65	2.65	2.65	3.05
dist. mill.....	3.20	3.30	3.30	3.60
Sheets, galv., No. 24, P'gh...	3.30	3.30	3.30	3.60
Sheets, galv., No. 24, Chicago	3.30	3.40	3.40	3.80
dist. mill.....	2.15	2.15	2.25	2.20
Sheets, blue, No. 13, P'gh...	2.25	2.25	2.35	2.40
Sheets, blue, No. 13, Chicago	2.15	2.15	2.15	2.65
dist. mill.....	2.20	2.20	2.25	2.70
Wire nails, Pittsburgh.....	2.30	2.30	2.40	2.50
Wire nails, Chicago dist. mill.	2.35	2.35	2.45	2.55
Plain wire, Pittsburgh.....	2.80	2.80	2.95	3.30
Plain wire, Chicago dist. mill.	2.85	2.85	2.95	3.35
Barbed wire, galv., Pittsburgh	2.85	2.85	2.95	3.35
Barbed wire, galv., Chicago	2.85	2.85	2.95	3.35
dist. mill.....	\$5.25	\$5.25	\$5.25	\$5.35
Tin plate, 100 lb. box, P'gh...				

Old Material, Per Gross Ton:	May 13, 1930	May 6, 1930	Apr. 15, 1930	May 14, 1929
Heavy melting steel, P'gh....	\$15.50	\$15.75	\$16.00	\$17.75
Heavy melting steel, Phila....	13.50	13.50	14.00	16.50
Heavy melting steel, Ch'go....	12.50	12.75	13.00	15.50
Carwheels, Chicago.....	14.00	14.00	14.50	14.50
Carwheels, Philadelphia.....	15.00	15.00	15.00	16.50
No. 1 cast, Pittsburgh.....	14.25	14.25	14.50	15.00
No. 1 cast, Philadelphia.....	14.00	14.00	15.00	16.50
No. 1 cast, Ch'go (net ton)...	12.75	13.25	13.50	15.50
No. 1 RR. wrot., Phila.....	15.00	15.00	15.00	16.00
No. 1 RR. wrot., Ch'go (net)...	11.25	11.25	12.25	14.00

Coke, Connellsville,	May 13, 1930	May 6, 1930	Apr. 15, 1930	May 14, 1929
Per Net Ton at Oven:				
Furnace coke, prompt.....	\$2.50	\$2.60	\$2.60	\$2.75
Foundry coke, prompt.....	3.50	3.50	3.50	3.75

Metals,	May 13, 1930	May 6, 1930	Apr. 15, 1930	May 14, 1929
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	13.00	13.12 1/2	14.12 1/2	18.12 1/2
Electrolytic copper, refinery..	12.75	12.25	13.75	17.75
Tin (Straits), New York.....	32.87 1/2	32.00	36.37 1/2	44.25
Zinc, East St. Louis.....	4.60	4.65	4.90	6.67 1/2
Zinc, New York.....	4.95	5.00	5.25	7.02 1/2
Lead, St. Louis.....	5.50	5.35	5.40	6.75
Lead, New York.....	5.60	5.40	5.50	7.00
Antimony (Asiatic), N. Y....	7.50	7.50	8.00	9.00

## PITTSBURGH

## Price Weakness Continues as Business Fails to Make Gains

PITTSBURGH, May 13.—Steel business in this district seems to be slightly quieter. Whether this is an indication of a definite downward turn in demand which may extend through the summer months, or merely a temporary lull in activity, is a question on which current developments throw little light, but it does seem likely that, unless tonnage begins to reach the mills in heavier volume before the end of this month or the first part of June, further curtailment must be expected in the summer months.

The intermittent character of current specifications makes it extremely difficult to gage the market accurately. Finishing mill operations fluctuate widely from week to week. If there is a trend in open-hearth schedules, it has been downward since the first of the month, and this tendency has not been checked. The largest producers in the district are still maintaining a steel-making rate of about 75 per cent of capacity, but the average of the smaller independents is somewhat lower. At Youngstown, steel is being produced at about 70 per cent, and in the Ohio River district the average is about the same.

Among specific finished steel products, reinforcing bars and pipe seem to hold out the best prospects at this time. Extensive civil engineering projects in nearly all parts of the country are requiring heavy tonnages of reinforcing steel, and increased specifications at the mills are beginning to result in some backlog tonnage. Aggregate business in this product is equal to last year's with some companies.

Line pipe is the center of interest among the tubular products. The Sun Oil Co. has placed a 20,000-ton order for a 6-in. gasoline-carrying line across Pennsylvania, which may run into almost twice that tonnage if proposed extensions are made. Two other large oil companies are in the market for long gasoline lines, and several hundred thousand tons of large diameter line pipe is in prospect for placing during the summer. Demand is quiet

for other tubular goods, although standard pipe has been slightly more active this month. Conservative estimates place the decline in standard pipe this year as compared with last at about 20 per cent.

Hot-rolled strip is still fairly active, although no further improvement in specifications is reported. Hot strip mills are running at 70 to 80 per cent of capacity, which is the best average maintained this year. Cold-rolled strip is still very dull. Demand for sheets is holding its own and is sufficient to maintain operations at about 70 per cent of capacity for the industry as a whole.

Price weakness is still a deterrent to forward buying, and the market has attained no further stability in the last week, except possibly on wire and nails, on which reductions were made recently. Bolts and nuts have declined, with an advance of three points on the standard discount, while large rivets are off \$4 a ton to \$2.90, Pittsburgh or Cleveland. On galvanized sheets, a 3.20c., Pittsburgh, price, which had formerly been con-



finer only to large jobbers, is being extended more widely to the trade, and that market is now quotable at 3.20c. to 3.30c. Auto body sheets lack strength at 3.80c., Pittsburgh, while the remaining finishes are being held within the range of \$2 a ton, which has been quoted for some weeks. On bars, plates and shapes the 1.75c., Pittsburgh, price is increasingly common, and concessions to 1.70c., Pittsburgh, have been made in some territories on plates and shapes. Makers of reinforcing bars are still trying to hold at 1.80c. minimum, at least in the immediate Pittsburgh territory.

Pig iron is very dull, but market quotations are unchanged. This is the only important district in the country in which prices have not been revised downward in the last few weeks. Furnace coke has declined 10c. a ton to \$2.50, Connellsville, and heavy melting steel is 25c. a ton lower, following a week of considerable mill buying.

**Semi-Finished Steel.**—Shipments of some makers this month are running slightly behind the corresponding April period, and generally are fluctuating rather sharply from week to week. Non-integrated steel companies are anxious to keep their stocks low and the uncertainty of the price situation is keeping new buying at a minimum. Shipments of billets, slabs and sheet bars generally are still being made on a \$33 basis, although this does not mean that the heavy tonnage users are paying that price. The usual price differentials prevail, but the \$33 price constitutes the basis for their application. Forging billets are holding at \$38, Pittsburgh, and demand is steady. Wire rods stand at \$36, Pittsburgh or Cleveland, following a reduction on May 1.

**Pig Iron.**—Sales are confined to small lots, and shipments are light. Occasional shading of prices on foundry iron is reported, but when traced this usually proves to be in the form of concessions by Valley furnaces to meet the lower freight rate of the Pittsburgh merchant producer. Radiator and sanitary ware makers are only operating two or three days a week, and jobbing foundries are running slowly. Heavy machinery and

**Steel business is quieter. Operations of leading producers not above 75 per cent, some lower.**

\* \* \*

**Largest demands are for reinforcing bars and pipe, the latter principally for oil and gas lines.**

\* \* \*

**On bars, plates and shapes, 1.75c. price is increasingly common, with concessions to 1.70c. in some districts.**

\* \* \*

**Bolts, nuts and rivet prices reduced.**

\* \* \*

**Scrap prices continue their downward trend.**

roll makers are going at a slightly better rate, but not sufficiently high to stimulate forward buying as long as iron is plentiful. New inquiry is lacking, as concerns which do not buy on a contract basis are getting their requirements in the open market without circularizing the trade.

*Prices per gross ton, f.o.b. Valley furnace:*  
Basic ..... \$18.50  
Bessemer ..... 19.00  
Gray forge ..... 18.00  
No. 2 foundry ..... 18.50  
No. 3 foundry ..... 18.00  
Malleable ..... 19.00  
Low phos., copper free ..... 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

*Prices per gross ton, f.o.b. Pittsburgh district furnace:*  
Basic ..... \$19.00  
No. 2 foundry ..... 19.00  
No. 3 foundry ..... 18.50  
Malleable ..... 19.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

**Bars, Plates and Shapes.**—Business is restricted but sufficient to sustain a mill operation of 70 to 75 per cent on plates and shapes, and at least 65 per cent on bars. Current specifications fully justify such schedules, and on nearly all business, except large structural steel and reinforcing bar projects, tonnage releases are for rush shipment. Very early deliveries can be made on all the heavy hot-rolled products, except possibly rein-

forcing bars, on which some mills are accumulating comfortable backlogs.

Demand for reinforcing bars is nearly equal to the corresponding time last year with some companies. Merchant bars are in light demand, although shipments are well distributed throughout the important consuming industries and users' stocks are low. Fabricated structural business is coming in rather slowly, but improvement is steady and local shops will likely be engaged at a much better rate in another month. Demand for plates is light, with the railroad car builders specifying in limited amounts and other large consumers holding their requirements at a minimum. Prices are generally unchanged, with 1.75c. ruling on large tonnage of bars, shapes and plates, though concessions to 1.70c. on plates and shapes have been made.

**Tubular Goods.**—Line pipe is still a feature of this market, although demand for standard or butt-weld material has improved slightly since the first of the month. The Sun Oil Co. divided several hundred miles of 6-in. seamless tubing for a gasoline carrying line running across the State of Pennsylvania between the National Tube Co. and the Jones & Laughlin Steel Corporation. This job will call for at least 20,000 tons of pipe, and, if some of the projected extensions materialize, the tonnage will run much higher.

The Barnsdall Corporation has not yet placed its 800-mile gasoline line to run from Oklahoma to Milwaukee, which will require about 40,000 tons of 6 and 8-in. pipe. The latest gasoline carrying project is that of the Phillips Petroleum Co., which will run a line from the Texas fields to Kansas City, a distance of 350 miles. A possible extension to points East may require 400 miles additional. The Columbia Gas & Electric Corporation is planning a 400-mile gas line to run from West Virginia to Washington and Baltimore. This line is expected to call for 24-in. pipe, and to be let before summer. In the South the Southern Natural Gas Corporation contemplates an 800-mile gas line running from Mid-Continent fields to Alabama and Georgia. Another line is projected to carry gas

## THE IRON AGE Composite Prices

### Finished Steel

May 13, 1930, 2.228c. a Lb.

One week ago.....	2.228c.
One month ago.....	2.264c.
One year ago.....	2.412c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1930	2.362c., Jan. 7;	2.228c., May 6
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

### Pig Iron

May 13, 1930, \$17.58 a Gross Ton

One week ago.....	\$17.67
One month ago.....	17.75
One year ago.....	18.71

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1930	\$18.21, Jan. 7;	\$17.50, May 13
1929	18.71, May 14;	18.21, Dec. 17
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

# Mill Prices of Finished Iron and Steel Products

## Iron and Steel Bars

Soft Steel	Base per Lb.
F.o.b. Pittsburgh mill.....	1.75c. to 1.80c.
F.o.b. Chicago.....	1.85c. to 1.95c.
Del'd Philadelphia.....	2.07c. to 2.12c.
Del'd New York.....	2.09c. to 2.14c.
F.o.b. Cleveland.....	1.75c. to 1.80c.
F.o.b. Lackawanna.....	1.85c. to 1.90c.
F.o.b. Birmingham.....	1.95c. to 2.00c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c.

## Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.....	1.75c. to 1.80c.
F.o.b. P'gh mills, cut lengths.....	2.00c. to 2.05c.
F.o.b. Birmingham, mill lengths.....	1.95c. to 2.00c.

## Rail Steel

F.o.b. mills, east of Chicago dist.....	1.70c. to 1.80c.
F.o.b. Chicago Heights mill.....	1.80c.
Del'd Philadelphia.....	2.12c. to 2.22c.

## Iron

Common iron, f.o.b. Chicago.....	1.90c. to 1.95c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

## Tank Plates

Tank Rates		Base per Lb.
F.o.b.	Pittsburgh mill.....	1.75c. to 1.80c.
F.o.b.	Chicago.....	1.85c. to 1.95c.
F.o.b.	Birmingham.....	1.95c. to 2.00c.
Del'd	Cleveland.....	1.89c. to 1.94c.
Del'd	Philadelphia.....	1.95c. to 2.00c.
F.o.b.	Coatesville.....	1.80c. to 1.85c.
F.o.b.	Sparrows Point.....	1.85c. to 1.90c.
F.o.b.	Lackawanna.....	1.85c. to 1.95c.
Del'd	New York.....	1.97½c. to 2.02½c.
C.i.f.	Pacific ports.....	2.20c.

## Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.75c. to 1.80c.
F.o.b. Chicago.....	1.85c. to 1.95c.
F.o.b. Birmingham.....	1.95c. to 2.00c.
F.o.b. Lackawanna.....	1.85c. to 1.95c.
F.o.b. Bethlehem.....	1.80c. to 1.90c.
Del'd Cleveland.....	1.89c. to 1.94c.
Del'd Philadelphia.....	1.81c. to 1.86c.
Del'd New York.....	1.94½c. to 2.04½c.
C.i.f. Pacific ports.....	2.35c.

## Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh.....	1.80c. to 1.90c.
Wider than 6 in., P'gh.....	1.70c. to 1.80c.
6 in. and narrower, Chicago.....	1.90c. to 2.00c.
Wider than 6 in., Chicago.....	1.80c. to 1.90c.
Cooperage stock, P'gh.....	2.10c. to 2.20c.
Cooperage stock, Chicago.....	2.30c.

## Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.10c.
Bars, f.o.b. Chicago.....	2.10c.
Bars, Cleveland.....	2.10c.
Bars, Buffalo.....	2.10c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 3.40c.
Strips, P'gh.....	2.45c. to 2.55c.
Strips, Cleveland.....	2.55c.
Strips, del'd Chicago.....	2.85c.
Strips, Worcester.....	2.70c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland.....	3.80c. to 3.90c.

\*According to size.

## Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)  
To Merchant Trade

	Base per Keg
Standard wire nails.....	\$2.15 to \$2.25
Cement coated nails.....	2.15 to 2.25
Galvanized nails.....	4.15 to 4.25
	Base per Lb.
Polished staples.....	2.60c. to 2.70c.
Galvanized staples.....	2.85c. to 2.90c.
Barbed wire, galvanized.....	2.80c. to 2.90c.
Annealed fence wire.....	2.30c. to 2.40c.
Galvanized wire, No. 9.....	2.75c. to 2.85c.
Woven wire fence (per net ton to re-tailers).....	\$65.00

## To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage.....	2.30c.
Spring wire.....	3.30c.
(Carload lots, f.o.b. Chicago)	
Wire nails .....	\$2.20 to \$2.30 (keg)
Annealed fence wire.....	2.40c. to 2.50c. (lb.)
Bright hard wire to manufacturing trade.....	2.35c.

Anderson, Ind., mill prices are ordinarily \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

## Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa. ....	\$2.55 to \$2.60
Less carloads, Wheeling or Reading	2.70

## Light Plates

No. 10, blue annealed, f.o.b. P'gh.....	2.00c. to 2.10c.
No. 10, blue annealed, f.o.b. Chicago dist.....	2.10c. to 2.20c.
No. 10, blue annealed, del'd Phila.....	2.32c. to 2.42c.
No. 10, blue annealed, B'ham.....	2.25c.

## Sheets

Blue Annealed	Base per Lb.
No. 13, f.o.b. P'gh.....	2.15c. to 2.25c.
No. 13, f.o.b. Chicago dist.....	2.25c. to 2.35c.
No. 13, del'd Philadelphia.....	2.47c. to 2.57c.
No. 13, blue annealed, B'ham.....	2.40c.

## Continuous Mill Sheets

No. 10 gage, f.o.b. P'gh.....	1.80c. to 1.90c.
No. 13 gage, f.o.b. P'gh.....	1.95c. to 2.05c.
(Usual range 24 in. to 48 in. wide)	

## Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.55c. to 2.65c.
No. 24, f.o.b. Chicago dist. mill.....	2.65c. to 2.75c.
No. 24, del'd Philadelphia.....	2.97c.
No. 24, f.o.b. Birmingham.....	2.80c.

## Steel Furniture Sheets

No. 24, f.o.b. P'gh.....	3.80c. to 3.90c.
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## Galvanized

No. 24, f.o.b. Pittsburgh.....	3.20c. to 3.30c.
No. 24, f.o.b. Chicago dist. mill.....	3.30c. to 3.40c.
No. 24, del'd Cleveland.....	3.49c.
No. 24, del'd Philadelphia.....	3.62c.
No. 24, f.o.b. Birmingham.....	3.45c.

## Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.80c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill.....	2.90c. to 3.00c.

## Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	3.80c.
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## Long Ternes

No. 24, 8-lb. coating, f.o.b. mill.....	3.80c. to 3.90c.
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## Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
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## Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills...	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

## Terne Plate

(F.o.b. Morgantown or Pittsburgh) (Per Package, 20 x 28 in.)
8-lb. coating I.C. \$10.70   25-lb. coating I.C. \$15.90
15-lb. coating I.C. 13.40   30-lb. coating I.C. 16.80
20-lb. coating I.C. 14.60   40-lb. coating I.C. 18.80

## Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers

Alloy Differential

2000 (¼% Nickel).....\$0.25

2100 (1½% Nickel).....0.55

2300 (3½% Nickel).....1.50

2500 (5% Nickel).....2.25

3100 Nickel Chromium.....0.55

3200 Nickel Chromium.....1.35

3300 Nickel Chromium.....3.80

3400 Nickel Chromium.....3.20

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....0.50

4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....0.70

4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....1.05

5100 Chromium Steel (0.60 to 0.90 Chromium).....0.35

5100 Chromium Steel (0.80 to 1.10 Chromium).....0.45

5100 Chromium Spring Steel.....0.20

6100 Chromium Vanadium Bar.....1.20

6100 Chromium Vanadium Spring Steel.....0.95

9250 Silicon Manganese Spring Steel (flats).....0.25

Rounds and squares.....0.50

Chromium Nickel Vanadium.....1.50

Carbon Vanadium.....0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¼c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

## Rails

Standard, f.o.b. mill.....	\$43.
Light (from billets), f.o.b. mill.....	36.
Light (from rail steel), f.o.b. mill.....	34.
Light (from billets), f.o.b. Ch'go mill.....	36.

## Track Equipment

	Base per 100 L
Spikes, $\frac{1}{2}$ in. and larger.....	\$2.80
Spikes, $\frac{1}{4}$ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plate, steel.....	2.07½

Angle bars.....	\$2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

## Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Inches	Steel	Black	Galv.	Inches	Iron	Black	Galv.
1½.....	47	21½	1½ and ¾.....	+11	+36		
2.....	53	27½	2.....	23	5		
2½.....	58	44½	3.....	28	11		
3.....	62	50½	4 and 5.....	31	15		
3½.....	64	52½	5 and 6.....	35	18		

## Lap Weld

2.....	57	45½	2.....	23	9
2½ to 6.....	61	49½	2½ to 3½.....	28	13
7 and 8.....	58	45½	4 to 6.....	30	17
9 and 10.....	56	43½	7 and 8.....	29	16
11 and 12.....	55	42½	9 to 12.....	26	11

## Butt Weld, extra strong, plain ends

1½.....	43	26½	1½ and ¾.....	+13	+48
2.....	49	32½	2.....	23	7
2½.....	55	44½	3.....	28	12
3.....	60	49½	4.....	34	18
3½.....	62	51½	5.....		
4.....	63	52½	6.....		

## Lap Weld, extra strong, plain ends

2.....	55	44½	2.....	29	13
2½ to 4.....	59	48½	2½ to 4.....	34	20
4½ to 6.....	58	47½	4½ to 6.....	33	19
7 to 8.....	54	41½	7 and 8.....	31	17
9 and 10.....	47	34½	9 to 12.....	21	8
11 and 12.....	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

## Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel	Charcoal Iron
2 in. and 2½ in.....	38
2½ in.—2¾ in.....	46
3 in.....	52
3½ in.—3¾ in.....	54
4 in.....	57
4½ in. to 6 in.....	46
1½ in.....	1
1¾ in.....	8
2 in.—2¼ in.....	13
2½ in.—2¾ in.....	16
3 in.....	17
3½ in. to 3¾ in.....	18
4 in.....	20
4½ in.....	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts: Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

## Standard Commercial Seamless Boiler Tubes

### Cold Drawn

1 in.....	61	3 in.....	46
1½ to 1¾ in.....	53	3½ to 3¾ in.....	48
1¾ in.....	37	4 in.....	51
2 to 2½ in.....	32	4½, 5 and 6 in.....	40
2½ to 3 in.....	40		

### Hot Rolled

2 and 2½ in.....	38	3½ to 3¾ in.....	54
2½ and 2¾ in.....	46	4 in.....	57
3 in.....	52	4½, 5 and 6 in.....	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

## Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)...	55
Carbon, 0.30% to 0.40% base.....	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.



from the Oklahoma fields to New Mexico and Arizona. The Cities Service line, to extend from Oklahoma to Chicago, is yet to be placed in its entirety, although a portion of the pipe is to be furnished by the National Tube Co.

**Wire Products.**—Business has not benefited materially by the recent price reduction on merchant and manufacturers' wire products, although tonnage this month is running about the same as it did in April. Prices are more stable at the new levels, and consumers, who are generally apathetic with regard to their future needs, are making no effort to test the market. Occasional weakness in nails is still reported from some centers, although the market around Pittsburgh is established at \$2.15 per keg to the large jobbers, and \$2.25 to the trade. Manufacturers' wire is also well maintained at 2.20c., Pittsburgh.

**Bolts, Nuts and Rivets.**—Leading manufacturers have increased discounts on bolts and nuts 3 points to 73 per cent off list and have reduced quotations on large rivets \$4 a ton to 2.90c. per lb., Pittsburgh or Cleveland. The increase in bolt and nut discounts amounts to an extra 10 per cent in addition to the old 70 per cent discount. Prices on small rivets are unchanged at 70 and 10 per cent off list. The reductions are made largely to conform with the decline in wire and rod prices over the last few months and are not the result of any outstanding market weakness. Business continues at approximately the same rate that has prevailed for several weeks, with demand from the structural industry rather light. Barge yards and other plate fabricators are also quiet. The bolt nut and rivet industry is operating at about 60 per cent of capacity.

**Sheets.**—Sheet specifications were slightly heavier last week with some makers, but operations fell under the 70 per cent level. Increases in several mills this week will likely maintain the average at 70 per cent of capacity, a figure which has been fairly representative of the industry's engagement for several weeks. Demand is well diversified, with shipments to the automobile industry running slightly ahead of last month, and other lines maintaining recent levels. Rush shipments are frequently required by all classes of trade, and even a slight improvement in business would force many buyers to lengthen out their commitments considerably.

Further weakness in galvanized sheet prices has resulted in the extension of the 3.20c., Pittsburgh, price to large manufacturers as well as to jobbers, and the market is now quotable at 3.20c. to 3.30c., Pittsburgh. Otherwise prices are unchanged, although on automobile body stock 3.80c., Pittsburgh, has been subject to considerable pressure and beaten \$2 a ton or more on a few occasions. Black sheets stand at 2.55c. to 2.65c., Pittsburgh, the latter

figure representing the usual quotation of leading mills to the smaller buyer. Light plates are unchanged at 2c. to 2.10c., Pittsburgh, and blue annealed material at 2.15c. to 2.25c. Continuous mills are quoting prices \$2 to \$4 a ton under the jobbing mill figures.

**Tin Plate.**—Further curtailment in production has brought the average operating rate for the industry to less than 80 per cent of capacity and not far above 75 per cent. The leading producer is running at the latter figure and one or two independent companies at lower rates. Only two companies are now reported to be operating all their mills 16 turns a week. Specifications are coming in at a fair rate, but this is a season of uncertainty in crop prospects and neither the container manufacturers nor the canning companies are willing to be burdened with additional stock at this time.

**Strip Steel.**—Demand for hot-rolled strip has shown no additional improvement in the last week, but specifications are keeping up to recent levels, which are the best of the year. Mill operations average 70 to 80 per cent of capacity, with a few companies engaged at close to 100 per cent. Deliveries on some sizes are extended from 10 days to two weeks. The automobile industry is responsible for a considerable share of this business.

On cold-rolled material, there has been little change, with demand very light and mill operations not above 40 per cent of capacity. Prices are also weak, and substantial tonnages are regularly bringing out a 2.45c., Pittsburgh, price. On small lots the quoted price of 2.55c. still prevails and no further open reduction in this

figure is expected. Prices on hot-rolled strip are being comparatively well maintained.

**Coal and Coke.**—A number of producers of furnace coke have finally reduced their spot price to \$2.50, Connellsville, following several weeks of instability at \$2.60. The move has not stimulated business to any extent, and competition from by-product plants is severe. The latter have made prices recently that figure back to a low level at Connellsville. Foundry coke is also very dull, with prices maintained only on the premium grades. The coal business is benefiting slightly from the opening of the Lake navigation, but the market is demoralized from a price standpoint. Slack continues in good demand and prices are holding their recent strength.

**Old Material.**—The closing of the Pennsylvania list and substantial purchases of heavy melting steel by at least two consumers in this district have established the scrap market very definitely on a lower basis. The railroad list brought prices ranging from \$15.65 to \$16, although the greater part of the heavy melting steel is said to have gone direct to a mill at a figure closer to the lower side of this range. Purchase of a round tonnage of the railroad grade from a dealer at \$15.75 establishes the top of the market at that price, a decline of 25c. a ton from the last previous sale reported in the district. At the same time, two consumers were able to place orders at \$15.25. The railroad grade was not specified in either case, and freight rate considerations may have influenced the price slightly. Under the circumstances, the market on No. 1 steel is fairly quotable at \$15.25 to \$15.75, even though both top and bottom of the range represent actual purchases by mills.

*Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:*

Basic Open-Hearth Grades:	
No. 1 heavy melting steel..	\$15.25 to \$15.75
No. 2 heavy melting steel..	13.25 to 13.75
Scrap rails .....	14.50 to 15.00
Compressed sheet steel....	15.50 to 15.75
Bundled sheets, sides and ends .....	13.50 to 14.00
Cast iron carwheels.....	14.00 to 14.50
Sheet bar crops, ordinary..	16.50 to 17.00
Heavy breakable cast.....	11.50 to 12.00
No. 2 railroad wrought....	15.25 to 15.75
Hvy. steel axle turnings....	13.50 to 14.00
Machine shop turnings....	10.25 to 10.75
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	18.50 to 19.00
Railr. coil and leaf springs	18.50 to 19.00
Rolled steel wheels.....	18.50 to 19.00
Low phos. billet and bloom ends .....	20.00 to 20.50
Low phos. mill plates....	19.00 to 19.50
Low phos. light grades....	19.00 to 19.50
Low phos. sheet bar crops.	19.50 to 20.00
Heavy steel axle turnings.	13.50 to 14.00
Electric Furnace Grades:	
Low phos. punchings.....	18.00 to 18.50
Heavy steel axle turnings.	13.50 to 14.00
Blast Furnace Grades:	
Short shoveling steel turnings .....	10.50 to 11.00
Short mixed borings and turnings .....	10.50 to 11.00
Cast iron borings .....	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles .....	21.50 to 22.50
Cupola Grades:	
No. 1 cast .....	14.00 to 14.50
Rails 3 ft. and under....	18.00 to 18.50

#### Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates .....	3.00c.
Structural shapes .....	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.90c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats .....	4.10c.
Bands .....	3.25c.
Hoops .....	4.25c.
Black sheets (No. 24), 25 or more bundles .....	3.60c.
Galv. sheets (No. 24), 25 or more bundles .....	4.25c.
Light plates, blue annealed (No. 10), 1 to 24 plates.....	3.20c.
Blue annealed sheets (No. 13)....	3.25c.
Galv. corrug. sheets (No. 28), per square .....	4.13c.
Spikes, large .....	3.40c.
Small .....	3.80c. to 5.25c.
Boat .....	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb. \$3.50	
Wire, black, soft ann'l'd, base per 100 lb. ....	\$2.75 to 2.85
Wire, galv. soft, base per 100 lb. ....	3.20 to 3.30
Common wire nails, per keg. 2.60 to 2.75	
Cement coated nails, per keg 2.65 to 2.80	

\*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

# Semi-Finished Steel, Raw Materials, Bolts and Rivets

## Mill Prices of Semi-Finished Steel

Billets and Blooms		Sheet Bars		Skelp	
Per Gross Ton		(Open Hearth or Bessemer)		(F.o.b. Pittsburgh or Youngstown)	
		Per Gross Ton		Per Lb.	
Rerolling, 4-in. and under 10-in. Pitts-		Pittsburgh	\$33.00	Grooved	1.80c. to 1.85c.
burgh	\$33.00	Youngstown	33.00	Universal	1.80c. to 1.85c.
Rerolling, 4-in. and under 10-in., Youngs-		Cleveland	33.00	Sheared	1.80c. to 1.85c.
town	33.00				
Rerolling, 4-in. and under 10-in., Cleveland	33.00	Slabs		Wire Rods	
Rerolling, 4-in. and under 10-in., Chicago.	34.00	(8 in. x 2 in. and under 10 in. x 10 in.)		(Common soft, base)	
Forging quality, Pittsburgh.	38.00	Per Gross Ton		Per Gross Ton	
		Pittsburgh	\$33.00	Pittsburgh	\$36.00
		Youngstown	33.00	Cleveland	36.00
		Cleveland	33.00	Chicago	37.00

## Prices of Raw Material

Ores		Ferromanganese		Fluxes and Refractories	
Lake Superior Ores, Delivered Lower Lake Ports		Per Gross Ton		Fluorspar	
Per Gross Ton				Per Net Ton	
Old range Bessemer, 51.50% iron	\$4.80	Domestic, 80%, seaboard	\$94.00 to \$99.00	Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
Old range non-Bessemer, 51.50% iron	4.65	Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00	No. 2 lump, Illinois and Kentucky mines	20.00
Mesabi Bessemer, 51.50% iron	4.65			Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 18.50
Mesabi non-Bessemer, 51.50% iron	4.50			Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines	32.50
High phosphorus, 51.50% iron	4.40				
Foreign Ore, c.i.f. Philadelphia or Baltimore		Spiegeleisen		Fire Clay Brick	
Per Unit		Per Gross Ton Furnace		Per 1000 f.o.b. Works	
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	12.00c.	Domestic, 19 to 21%	\$31.00 to \$34.00	High-Heat	Intermediate
Iron ore, low phos., Swedish, average 68% iron	12.00c.	Domestic, 16 to 19%	29.00 to 32.00	Duty Brick	Heavy Duty Brick
Iron ore, basic Swedish, average 65% iron	10.00c.			Pennsylvania	\$43.00 to \$46.00
Manganese ore, washed 52% manganese, from the Caucasus	30.00c.	Electric Ferrosilicon		Maryland	43.00 to 46.00
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.	Per Gross Ton Delivered		New Jersey	50.00 to 65.00
Tungsten ore, high grade, per unit, in 60% concentrates	\$14.00 to \$16.50	50%	\$83.50	Ohio	43.00 to 46.00
Per Gross Ton		75%	130.00	Kentucky	43.00 to 46.00
Chrome ore, 45 to 50% Cr <sub>2</sub> O <sub>3</sub> , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00	10%	\$35.00	Missouri	43.00 to 46.00
Per Lb.		11%	37.00	Illinois	43.00 to 46.00
Molybdenum ore, 85% concentrates of MoS <sub>2</sub> , delivered	50c. to 55c.	12%	45.00	Grand fire clay, per ton	7.00
Coke		Bessemer Ferrosilicon		Silica Brick	
Per Net Ton		F.o.b. Jackson County, Ohio, Furnace		Per 1000 f.o.b. Works	
Furnace, f.o.b. Connellsville prompt	\$2.50 to \$2.60	10%	\$30.00	Pennsylvania	\$43.00
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.75	11%	32.00	Chicago	52.00
Foundry, by-products, Ch'go ovens	8.00			Birmingham	50.00
Foundry, by-products, New England, del'd	11.00			Silica clay, per ton	\$8.50 to 10.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40	Silvery Iron		Magnesite Brick	
Foundry, by-product, Phila.	9.00	F.o.b. Jackson County, Ohio, Furnace		Per Net Ton	
Foundry, Birmingham	5.00	6%	\$22.00	Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00	7%	\$22.50 to 23.00	Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Foundry by-prod., del'd St. Louis	9.00	8%	23.00 to 24.00	Standard size	45.00
		9%	24.00 to 25.00		
Coal		Other Ferroalloys		Chrome Brick	
Per Net Ton				Per Net Ton	
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75	Ferrotungsten, per lb. contained metal del'd	\$1.40 to \$1.50	Standard size	\$45.00
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75	Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	\$11.00c.		
Gas coal, 3/4-in. f.o.b. Pa. mines	1.90 to 2.00	Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65		
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75	Ferrocantitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	\$160.00		
Steam slack, f.o.b. W. Pa. mines	90c. to 1.10	Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	\$91.00		
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.25	Ferrophosphorus, electric 24%, f.o.b. An-niston, Ala., per gross ton	\$122.50		

## Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts		Bolts and Nuts		Small Rivets	
Per 100 Pieces		Per Cent Off List		(3/8-in. and smaller)	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)				Per Cent Off List	
†Machine bolts	73	Semi-finished hexagon nuts	73	F.o.b. Pittsburgh	70 and 10
†Carriage bolts	73	Semi-finished hexagon castellated nuts, S.A.E.	73	F.o.b. Cleveland	70 and 10
Lag bolts	73	Stove bolts in packages, P'gh.	80, 10, 10 and 5	F.o.b. Chicago	70 and 10
Plow bolts, Nos. 1, 2, 3 and 7 heads	73	Stove bolts in packages, Chicago.	80, 10, 10 and 5		
Hot-pressed nuts, blank or tapped, square	73	Stove bolts in packages, Cleveland.	80, 10, 10 and 5	Cap and Set Screws	
Hot-pressed nuts, blank or tapped, hexagons	73	Stove bolts in bulk, P'gh.	80, 10, 10, 5 and 2 1/2	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
C.p.c. and t. square or hex. nuts, blank or tapped	73	Stove bolts in bulk, Chicago.	80, 10, 10, 5 and 2 1/2	Per Cent Off List	
Washers*	7.00c. to 6.75c. per lb. off list	Tire bolts	60, 10 and 10	Milled cap screws	80, 10 and 5
				Milled standard set screws, case hardened	80 and 5
		Discounts of 73 per cent off on bolts and nuts applied on carload business.		Milled headless set screws, cut thread	75 and 10
		Large Rivets		Upset hex. head cap screws, U.S.S. thread	85 and 10
		(1/2-in. and larger)		Upset hex. cap screws, S.A.E. thread	85 and 10
		Base per 100 Lb.		Upset set screws	80, 10 and 5
		F.o.b. Pittsburgh or Cleveland	\$2.90	Milled studs	70
		F.o.b. Chicago	3.00		

\*F.o.b. Chicago, New York and Pittsburgh.  
†Bolts with rolled thread up to and including 3/8 in. x 6 in. take 10 per cent lower list prices.



# CHICAGO

## Steel Shipments and Specifications Fairly Steady —Ingot Output Off Slightly

CHICAGO, May 13.—New sales of finished steel at mid-month are not impressive and backlogs are growing lighter, but, with purchasing periods following one another at 30-day intervals, the trade is anticipating another monthly buying movement in the course of the next 10 days. In the meantime, shipments and specifications remain steady, with only slight changes from the average of recent weeks.

Distribution of steel in the West gives some signs of changing. Specifications from automobile manufacturers gradually grow heavier. The building industry is making additional headway, awards for the week reaching the total of 14,000 tons, while inquiries stand at 16,000 tons. On the other hand, some uncertainty exists as to the course of the farm implement trade. It is admitted that output of this kind of equipment is showing signs of tapering, and it is intimated that this industry may already have overproduced by a small margin.

News of oil and gas line projects continues to hold the attention of sellers of oil country goods. An announcement from Texas states that construction of the 725-mile gas line from Texas fields to Minneapolis will be started in a few days by the Missouri-Kansas Pipe Line Co.

There is still no development to check the downward drift of iron and steel prices.

Boat iron arriving at Chicago is a disturbing factor in the pig iron market. Scrap is weak, with a number of grades at lower prices.

The Illinois Steel Co. has lighted No. 10 furnace at Gary, thereby making use of 19 of 27 stacks. The count for the district stands at 27 active furnaces of 36. Ingot production is a shade lighter at 90 per cent of capacity.

**Pig Iron.**—Boat iron is again reaching Chicago, receipts this week from Lake Erie ports having been about 9000 tons. One cargo contained 7000 tons, probably one of the largest single consignments of pig iron to reach a Chicago dock. Part of the tonnage received is said to have been on order and the remainder has been placed on docks and is being offered in the open market at prices that are below quotations being made by Chicago furnaces for local delivery. Operators of the Iroquois furnaces expect to light No. 3 furnace about May 20. Since furnace stocks have been gradually growing lighter, it is planned to keep all merchant furnaces lighted during the near future. The silvery market is stagnant, and prices continue their downward trend.

### Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$19.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	19.50
Malleable, not over 2.25 sil. ....	19.00
High phosphorus .....	19.00
Lake Super. char'cl, sil. 1.50. ....	27.04
S'th'n No. 2 fdy. ....	\$18.20 to 19.01
Low phos., sil. 1 to 2, copper free..	29.50
Silvery, sil. 8 per cent. ....	\$27.79 to 28.79
Bess. ferrosilicon, 14-15 per cent. ....	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

**Coke.**—This market is steady. The

price is unchanged at \$8 a ton, f.o.b. local ovens.

**Plates.**—Reports of new developments in the oil-producing sections of the Southwest continue to reach Chicago. The Phillips Petroleum Co. has formed the Phillips Pipe Line Co. for the purpose of building an 8 and 10-in. pipe line from the Panhandle of Texas to Kansas and points east, a total distance of 800 to 1000 miles. An oil refiner in Oklahoma has placed 1000 tons of plates for storage tank construction. New inquiries of a like kind are lacking, but the tonnage overhanging the market is impressive. Shipments of plates to the Milwaukee pipe fabricator are heavy and fully up to the schedule arranged early in April. Part of this steel is moving by rail and part by water. Shipping instructions already given by the Milwaukee company indicate that deliveries will continue heavy through most of June.

The railroad equipment market is somewhat more active. The Milwaukee has ordered 500 stock cars

from a Western car builder. These will require about 5500 tons of steel. The Illinois Central cars, which are expected to be placed soon, will put over 25,000 tons of steel on mill books. The volume of miscellaneous plate business placed from week to week has shown little change. Generally orders are small and it is the exception when very prompt shipment is not insisted on. Some Western mills are promising no better than 30 days' delivery on sheared plates and 30 to 40 days' shipment on the universal mill product. Other producers are in a position to do better than this, and sellers from the East are making promises that are important factors in diverting business to them. Plate prices range from 1.85c. to 1.95c. a lb., Chicago.

**Ferroalloys.**—Shipments against contracts are in fair volume. Spot business is dull. Prices are holding on such business as is being done from week to week.

**Bolts, Nuts and Rivets.**—Prices on bolts and nuts are being reduced. Machine bolts and hot-pressed nuts are now being quoted 73 per cent off list in carload lots and stove bolts are being quoted at 80, 10, 10 and 5 per cent off list. Spot buying in this market is quiet. Specifications are about equal to the average of recent weeks.

**Structural Material.**—New fabricating contracts call for a total of over 14,000 tons, including 8000 tons for a power plant at Kansas City, Mo., 2500 tons for a laboratory at Milwaukee and 2000 tons for a highway bridge in Illinois. The Santa Fe's 1930 bridge requirements, which were reported as placed last week, may amount to 11,000 tons, rather than 7000 tons, as first given out. This railroad has 7500 tons pending for a bridge in Illinois, bids for which were taken late this week.

Fresh inquiries, at over 16,000 tons, mark the second successive week in which new projects have shown up unusually well. Tonnages are well diversified, both geographically and as to the purpose for which the steel will be used. Railroads will take 7500 tons, industrial buildings, 2000 tons, and bridges and viaducts, 5500 tons. As gaged by geographical distribution, there is still reason for local fabricators to view the business situation with some degree of anxiety. Shop schedules are probably not over 50 per cent of capacity in Chicago and the immediate vicinity, if the work the American Bridge Co. is doing for the Illinois Steel Co. is not taken into consideration. However, architects feel that a turn for the better is near.

### Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars .....	3.00c.
Reinforc'g bars, billet steel—	
Under 5 tons .....	2.85c.
5 tons to 30 tons .....	2.45c.
30 tons and over .....	2.00c.
Rail steel reinforcement.....	1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares .....	4.10c.
Bands (½ in. in Nos. 10 and 12 gages) .....	3.20c.
Hoops (No. 14 gage and lighter)...	3.75c.
Black sheets (No. 24).....	4.05c.
Galv. sheets (No. 24).....	4.60c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes (½ in. and larger).....	3.55c.
Track bolts .....	4.55c.
Rivets, structural .....	4.00c.
Rivets, boiler .....	4.00c.
	Per Cent Off List
Machine bolts .....	60
Carriage bolts .....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank..	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'd wire, per 100 lb. \$3.45	
Com. wire nails, base per keg \$2.75 to 2.85	
Cement c't'd nails, base per keg .....	2.75 to 2.85

**Bars.**—New orders and specifications for mild steel bars are holding mill operations steady at 80 to 85 per cent. Deliveries range from two to four weeks and prices are steady at 1.85c. to 1.95c. a lb., Chicago. Shipments in the current month promise to run equal to the April volume, which was the best for any month so far this year. Manufacturers of road machinery are producing close to capacity.

Demand for alloy steel bars continues to grow, and mill operations, which had been at a 70 per cent rate, now range from 75 to 80 per cent of capacity. This gain reflects a general increase in consumption by a larger circle of users, including automobile manufacturers. Iron bars are quiet, with prices weak at 1.90c. to 1.95c. a lb., Chicago. Little change has taken place in the rail steel bar market. The call for tubing rolled from old rails is about normal for this time of the year, but the demand for bars is spotty and mill schedules are unsatisfactory. Prices lack stability at 1.80c., Chicago.

**Wire Products.**—Dealers report a larger turnover of wire goods, but jobbers are experiencing a seasonal lull. Manufacturers' wire is moving no faster than at the turn of the month. The whole situation is summed up by wire mill operations, which stand at 50 per cent of capacity. The character of orders reflects the absence of stocks in the hands of users. Mill stocks are not excessive and they are well balanced. Lower prices for copper have not yet stimulated the copper wire market, though sellers are looking ahead to more active business.

**Cold-Rolled Strips.**—New buying and specifications are larger, as shown by operations, which have advanced from an average of 40 per cent to about 45 per cent of capacity.

**Rails and Track Supplies.**—Small orders for standard-section rails total 500 tons. It is probable that the secondary buying movement may come later than usual this year because of the spread of shipments, which this year ironed out the peak that ordinarily forces mills to the limit in the early spring. Railroad earnings in the last quarter of 1929 and in the early months of this year may also have a bearing on the size of secondary tonnages. Rail mills are scheduled to operate at 80 per cent of capacity throughout this month. Track accessory orders are spotty and in small aggregate.

*Prices f.o.b. mill, per gross ton:* Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

**Cast Iron Pipe.**—The Glamorgan Pipe & Foundry Co. has taken 1500 tons of 6 to 12-in. pipe for Chicago at \$46.50 a ton, delivered on the street. Among other awards are 150

**Ingot production off slightly to a shade over 90 per cent.**

\* \* \*

**Steel specifications and shipments remain fairly steady.**

\* \* \*

**Gains in orders for automobile and building industries. Farm implement production showing signs of tapering.**

\* \* \*

**Pig iron shipments by boat from Lake Erie total 9000 tons. Silvery prices lower.**

\* \* \*

**Scrap market weak. Declines occur in a number of important grades.**

tons of 6 to 12-in. pipe for Oak Park, Ill., to United States Pipe & Foundry Co., and 250 tons of 30 and 36-in. pipe for Lansing, Mich., to James B. Clow & Sons. Fresh inquiries are for small tonnages, such as 150 tons of 24-in. for Lorain, Ohio. This market is quieter than at any time since buying started in the early spring.

*Prices per net ton, deliv'd Chicago:* Water pipe, 6-in. and over, \$45.20 to \$46.20; 4-in., \$48.20 to \$49.20; Class A and gas pipe, \$3 extra.

**Sheets.**—The price structure in sheets remains unstable. Galvanized sheets are being commonly quoted at 3.35c. to 3.45c. a lb., Chicago, a reduction of \$2 a ton, and quotations on black sheets are weak. Blue annealed sheets are relatively stable, with mills comfortably booked for about three weeks. Although culvert manufacturers are enjoying a volume of business well above normal, they are carrying little stock and are pressing mills for frequent and prompt deliveries. Current specifications for sheets are spotty and barely support a hot mill output of 70 to 75 per cent of capacity.

*Base prices per lb., deliv'd from mill in Chicago:* No. 24 black sheets, 2.70c. to 2.80c.; No. 24 galv., 3.35c. to 3.45c.; No. 10 blue ann'd, 2.25c. *Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.*

**Reinforcing Bars.**—Demand for this commodity remains in substantial volume, though fresh inquiries are less numerous. Of special note is the award of 850 tons for a Chicago apartment building, the first of its kind in many months. An order for reinforcing steel for another large apartment building may be placed in a few days. Interest still runs high in roadwork reinforcement. General contracts on a substantial mileage of Illinois roads have been let, and orders for the necessary steel are expected at an early date.

Other work for Illinois includes three buildings for institutions at Jacksonville. It is reported that the Lane Technical High School, Chicago,

will be constructed of a combination of structural steel and reinforced concrete.

**Old Material.**—Heavy melting steel is off 25c. a ton on sales that this week have aggregated close to 20,000 tons. The new prices, which range from \$12.50 to \$13 a gross ton, delivered, lack strength, as do those on many other grades. Consumers have turned down offers of cast iron borings at \$9.25 a ton and dealers are trading in this grade at less than \$9. The condition of the scrap market leads many sellers to look for still lower prices. In fact, it is openly stated in some quarters that there will be little ahead of the scrap market in the way of betterment for at least 30 days. It is evident that some buyers have been oversold, and many of them are holding back shipments, much to the distress of sellers, who are finding it increasingly difficult to place tonnages that are appearing on track.

*Prices deliv'd Chicago district consumers.*

*Per Gross Ton*

**Basic Open-Hearth Grades:**

Heavy melting steel.....	\$12.50 to \$13.00
Shoveling steel.....	12.50 to 13.00
Frogs, switches and guards, cut apart, and misc. rails	13.25 to 13.75
Hydraul. compressed sheets	11.25 to 11.75
Drop forge flashings.....	9.50 to 10.00
No. 1 busheling.....	10.25 to 10.75
Forg'd cast and r'd steel carwheels.....	15.50 to 16.00
Railroad tires, charg. box size.....	16.00 to 16.50
Railroad leaf springs cut apart.....	16.50 to 17.00

**Acid Open-Hearth Grades:**

Steel couplers and knuckles	14.50 to 15.00
Coil springs.....	17.00 to 17.50

**Electric Furnace Grades:**

Axle turnings.....	12.00 to 12.50
Low phos. punchings.....	14.00 to 14.50
Low phos. plates, 12 in. and under.....	14.00 to 14.50

**Blast Furnace Grades:**

Axle turnings.....	10.50 to 11.00
Cast iron borings.....	8.75 to 9.25
Short shoveling turnings.....	8.75 to 9.25
Machine shop turnings.....	7.25 to 7.75

**Rolling Mill Grades:**

Iron rails.....	14.00 to 14.50
Rerolling rails.....	14.75 to 15.25

**Cupola Grades:**

Steel rails, less than 3 ft.....	15.00 to 15.50
Steel rails, less than 2 ft.....	15.75 to 16.25
Angle bars, steel.....	13.75 to 14.25
Cast iron carwheels.....	14.00 to 14.50

**Malleable Grades:**

Railroad.....	16.00 to 16.50
Agricultural.....	14.50 to 15.00

**Miscellaneous:**

*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.....	26.00 to 31.00

*Per Net Ton*

**Rolling Mill Grades:**

Iron angle and splice bars	13.50 to 14.00
Iron arch bars and transoms.....	15.00 to 15.50
Iron car axles.....	25.00 to 25.50
Steel car axles.....	16.00 to 16.50
No. 1 railroad wrought.....	11.25 to 11.75
No. 2 railroad wrought.....	11.00 to 11.50
No. 1 busheling.....	9.00 to 9.50
No. 2 busheling.....	7.25 to 7.75
Locomotive tires, smooth.....	14.50 to 15.00
Pipes and flues.....	8.50 to 9.00

**Cupola Grades:**

No. 1 machinery cast.....	12.75 to 13.25
No. 1 railroad cast.....	11.25 to 11.75
No. 1 agricultural cast.....	10.50 to 11.00
Stove plate.....	10.00 to 10.50
Grate bars.....	10.25 to 10.75
Brake shoes.....	9.75 to 10.25

\*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.



# NEW YORK

## Steel Orders Below Those of Corresponding April Period—Pig Iron Prices Weak

NEW YORK, May 13.—Sales of pig iron in the past week totaled 5000 tons, including about 500 tons of charcoal iron, which compares with 6500 tons in the previous week. New inquiry is generally limited to lots of a carload to 100 tons. Prices still lack firmness. Carload lots of Buffalo iron are reported to have brought out concessions from \$16 a ton, furnace. Heretofore shading has been restricted to the more desirable tonnages.

The first barge shipments of the season are beginning to arrive in New York harbor from Buffalo to be distributed to local consumers. Although Southern pig iron is not moving into this district in the substantial volume of a few weeks ago, it continues a factor in competition, and on a recent purchase of 300 tons of foundry iron for export to Chile, a Northern furnace interest obtained the order at \$18 a ton, f.a.s. New York.

The Worthington Pump & Machinery Corporation, Harrison, N. J., has closed on 150 tons of foundry iron for Elmwood Place, Ohio, and 50 tons for Holyoke, Mass. Manning, Maxwell & Moore, Inc., New York, are inquiring for 100 tons of foundry grade for the Putnam Machine Co., Fitchburg, Mass.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75 to 2.25	\$20.91 to \$21.41
*Buff. No. 2, del'd east.		
N. J.	19.28 to 19.78	
East. Pa. No. 2 fdy., sil.	1.75 to 2.25	19.39 to 21.02
East. Pa. No. 2X fdy., sil.	2.25 to 2.75	19.89 to 21.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

\*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

**Warehouse Business.**—Buying is still limited to small lots. Sheet prices lack firmness. Demand for galvanized sheets continues fair, but warehouse prices appear to be following the trend of recent mill quotations, with sales to consumers in this district at 4.15c. and 4.20c. a lb., base.

**Reinforcing Bars.**—Lettings are heavy, totaling 8550 tons. Two New York warehouse buildings account for an aggregate of 4200 tons, and highway construction calls for 4000 tons. Competition has been keen for the larger tonnages recently placed, with rail steel bars proving a formidable market factor. Quotations as low as 1.80c. and 1.75c., New York, have been reported on rail steel. With some of the larger projects closed, the price situation may grow steadier.

Highway construction, which has been important locally as an outlet for steel, is an expanding market for reinforcing throughout the country. National requirements this year in

mesh alone are estimated at 105,000 tons, as compared with barely 5000 tons annually a few years ago.

Concrete bars in 40, 50 and 60-ft. lengths for mill shipment are quoted at 1.75c. a lb., base Pittsburgh. Warehouse prices range from 2.44c. a lb., f.o.b. cars, New York, for carloads or larger lots to 3.25c. for the smallest tonnages.

**Cast Iron Pipe.**—The bulk of pressure pipe buying is in small lots for private companies. The total of such business, however, has been substantial, and northern foundries report operations at 80 to 90 per cent of rated capacity. The lack of large tonnage buying by utilities is attributed to the depression in residential building, which makes expansion of gas and water lines unnecessary. Producers of cast iron pipe are maintaining prices at about \$37 a net ton, f.o.b. foundry. The Southern Utility Co. has closed with the Lynchburg Foundry Co. on about 300 tons of gas pipe for the Durham Gas Co., Durham, N. C. Symonds & Stevens, Boston, are inquiring for 4000 tons of pipe for Hanover, Mass.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$39.90 to \$40.90; 4-in. and 5-in., \$42.90 to \$43.90; 3-in., \$49.90 to \$50.90. Class A and gas pipe, \$3 extra.

### Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll, strip, soft and quarter hard	4.95c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.60c.
Black sheets (No. 24*)	3.80c. to 4.00c.
Galvanized sheets (No. 24*)	4.25c. to 4.50c.
Long term sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	.60
1 x 30 in. and smaller	.50 to .50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller	.60
¾ x 20 in. and smaller	.50 to .50 and 10
Boller Tubes—	Per 100 Ft.
Lap welded, 2-in.	\$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

### Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

**Finished Steel.**—Orders for steel in the first third of May ran slightly behind the average of the corresponding period of April. In this district there are no signs of early improvement in the volume of buying, and general opinion in the trade is that conditions will remain about as they are now until late in the summer.

Although some steel companies indicate an unwillingness to make further price concessions, the weakness of the past month or more is still in evidence. Plates from eastern mills are now more generally quoted at 1.80c., Coatesville, Pa., or 1.97½c., New York, with sales of desirable tonnages at as low as 1.75c., Coatesville. Galvanized sheets are being sold to the better class of trade at 3.20c., Pittsburgh, with some jobbers getting 3.15c.

**Coke.**—With the seasonal demand for heating coke rapidly decreasing with the approach of warm weather, furnace coke quotations lack strength. Offers of distress carloads are increasing. Standard furnace grade is quotable at \$2.50 to \$2.60 per net ton, Connellsville. Foundry coke prices are as follows:

Special brands of beehive foundry coke, \$4.85 a net ton, ovens, or \$8.56 delivered to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and Brooklyn; by-product foundry coke, \$9 to \$9.40, Newark or Jersey City; \$10.06, New York or Brooklyn.

**Old Material.**—Buying prices of practically all grades have been reduced by brokers. Blast furnace scrap is being bought at \$9 a ton, delivered eastern Pennsylvania, following a sale to a consumer at \$9.50, delivered. No. 1 heavy melting steel is unchanged at \$9.50, New York, for eastern Pennsylvania delivery, but brokers buying for barge shipment to Buffalo have reduced their offers to \$10.50, on barge in the Harlem River or Gowanus Canal.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$9.50 to \$10.50
Heavy melting steel (yard)	6.75 to 7.25
No. 1 hvy. breakable cast	8.75 to 9.50
Stove plate (steel works)	6.50 to 7.00
Locomotive grate bars	7.00 to 7.50
Machine shop turnings	6.00 to 6.50
Short shoveling turnings	6.75 to 7.00
Cast borings (blast fur. or steel works)	6.50
Mixed borings and turnings	5.50
Steel car axles	17.00
Iron car axles	19.50 to 20.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.75
Forge fire	8.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.00 to 10.50
Stove plate (foundry)	8.50
Malleable cast (railroad)	10.50 to 11.00
Cast borings (chemical)	9.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	\$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size	13.00
No. 2 cast (radiators, cast boilers, etc.)	12.50

# PHILADELPHIA

## Steel Mill Operations Receding— Pig Iron Price Declines

**PHILADELPHIA, May 13.**—With steel mill operations in eastern Pennsylvania settling to about 60 per cent of capacity, except for the leading independent interest, prices lack firmness and concessions on desirable business are not uncommon.

Effective May 20, unless postponed, the new freight rates will bring a revision of finished steel prices delivered at Philadelphia. The new rates do not apply on pig iron, ingots, billets, blooms, sheet bars, skelp, rails or coiled rods. Minimum carloads are increased from 36,000 lb. to 40,000 lb. The freight rate from Pencoyd, Pa., the basing point on shapes for Philadelphia, continues at 6c. a 100 lb., but the rate from Coatesville, Pa., to Philadelphia, the basing point for plates, is increased from 10c. to 10½c. a 100 lb. and the rate from Pittsburgh, basing point for other products, is reduced from 32c. to 29c. a 100 lb.

**Pig Iron.**—Buying continues meager, and eastern Pennsylvania sellers are showing an increasing tendency to grant 50c. a ton concession from \$19.50 a ton, base furnace, on the smaller tonnages of foundry iron. Southern foundry iron is offered at \$12.50 a ton, Birmingham, and occasionally a Southern furnace is willing to waive the usual differential for silicon. Demand for low phosphorus iron is limited to small lots, and the price is fairly firm at \$24, with foreign low phosphorus recently offered at \$23.50, c.i.f. Philadelphia. The General Steel Castings Corporation, Ed-dystone, Pa., has closed on 2000 tons of basic iron with an eastern Pennsylvania steel mill furnace.

### Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$19.76 to \$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.26 to 20.76
East. Pa. No. 1X, 2.75 to 3.25 sil.	20.76 to 21.26
Basic (del'd east. Pa.)	\$18.75 to 19.00
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

**Bars.**—Small lots of bars are still quoted at 1.80c. a lb., Pittsburgh, or 2.12c., delivered Philadelphia, with medium-sized orders going at 1.75c., Pittsburgh, or 2.07c., delivered Philadelphia.

**Reinforcing Bars.**—No new reinforced concrete projects of size are in the market, and prices still lack strength, with quotations on recent business at about 1.85c., Pittsburgh, or 2.17c., delivered Philadelphia, for billet steel bars. Rail steel bars range from 1.70c. to 1.75c., Franklin, Pa., and Tonawanda, N. Y., or 2.02c. to 2.07c., delivered Philadelphia.

**Plates.**—Although mills are operating at slightly better than 60 per cent of rated capacity, the volume of new business booked so far this month has been insufficient to justify even these operating rates. Most of the

small tonnage business is being placed at 1.85c., Coatesville, Pa., or 1.95c., delivered Philadelphia, but there is an increasing tendency to quote 1.80c., Coatesville, Pa., or 1.90c., Philadelphia, on sales of plates with shapes and on orders from preferred buyers. The New York Shipbuilding & Dry Dock Co., Camden, N. J., has placed about 4000 tons of plates for a carfloat.

**Shapes.**—Buying has been small in the past two weeks and prices have generally settled to 1.75c. a lb., f.o.b. nearest mill to consumer, or 1.81c., delivered Philadelphia. On desirable specifications this price is shaded \$1 a ton to 1.70c., f.o.b. mill, or 1.76c., delivered Philadelphia. This week the Phoenix Iron Co., Phoenixville, Pa., rolled its first wide-flange, 10-in. beam.

**Sheets.**—Local consumers are generally operating at less than half their rated capacities, with the exception of one automobile body builder executing contracts for the Ford Motor Co. Radio manufacturers are engaged in experimental work, but production is low. Black sheets have settled to 2.55c., Pittsburgh, or 2.87c., delivered Philadelphia, while galvanized sheets are quotable at 3.20c. to 3.25c., Pittsburgh, or 3.52c. to 3.57c., delivered Philadelphia. Blue annealed sheets are still being sold in small lots at 2.25c.,

Pittsburgh, or 2.57c., delivered Philadelphia, for No. 13 gage, but a substantial amount of new business is at 2.15c., Pittsburgh, or 2.47c., Philadelphia. Blue annealed plates are quoted at 2c., Pittsburgh, or 2.32c., delivered Philadelphia.

**Imports.**—In the week ended May 10, 2000 tons of chrome ore arrived at this port from Portuguese Africa. Steel arrivals consisted of 48 tons of steel bars, 10 tons of structural shapes, five tons of steel bands and 49 tons of steel scrap, all from France.

**Old Material.**—Small tonnages of No. 1 heavy melting steel have been offered to consumers in this district at \$13.50 a ton, delivered, but no contracts have been closed. All grades of scrap show a tendency to decline, and recent transactions have shown reductions of about 50c. a ton. No. 1 blast furnace scrap has been sold at \$9.50 a ton, delivered, and machine shop turnings also declined to \$9.50 a ton on a recent sale to a Phoenixville, Pa., mill. Specification pipe is off 50c. a ton to \$13, delivered. A Coatesville, Pa., mill has bought heavy breakable cast at \$12.50 a ton, delivered.

### Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$13.50 to \$13.75
No. 2 heavy melting steel	11.00 to 11.50
Heavy melting steel (yard)	10.50 to 11.00
No. 1 railroad wrought	15.00 to 15.50
Bundled sheets (for steel works)	10.50 to 11.00
Hydraulic compressed, new	12.50 to 12.75
Hydraulic compressed, old	10.00
Machine shop turnings (for steel works)	9.50
Heavy axle turnings (or equiv.)	12.00 to 12.50
Cast borings (for steel works and roll. mill)	10.50
Heavy breakable cast (for steel works)	12.50 to 13.00
Railroad grate bars	10.50
Stove plate (for steel works)	10.50
No. 1 low phos., hvy., 0.04% and under	20.00 to 20.50
Couplers and knuckles	12.00 to 12.50
Roller steel wheels	18.50 to 19.00
No. 1 blast furnace scrap	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific)	13.00 to 13.50
Shafting	18.00 to 18.50
Steel axles	21.00 to 21.50
No. 1 forge fire	12.50 to 13.00
Cast iron carwheels	15.00
No. 1 cast	14.00 to 14.50
Cast borings (for chem. plant)	13.50 to 14.00
Steel rails for rolling	15.00 to 15.50

Porter-Cable Machine Co., Syracuse, N. Y., has appointed Homer Strong & Co. as its selling agents in the Buffalo and Rochester, N. Y., territories, and Charles A. Carpenter has been appointed representative in the Pittsburgh territory.

Brown & Sites Co., Inc., 30 Church Street, New York, has been appointed New York representative of the Dobbie Foundry & Machine Co., manufacturer of sheaves, winches and derrick fittings.

### Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅝-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.80c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'd sheets (No. 13)	3.40c.
Diam. pat. floor plates, ¼-in.	5.30c.
Swedish iron bars	6.60c.

\*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.

†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.



# CLEVELAND

## Mill Operations Gain to 76 Per Cent— Plates, Shapes and Bars Reduced

**C**LEVELAND, May 13.—Finishing mills in this district are maintaining recent operations, and the volume of business shows little change, although a few of the sheet and hot-rolled strip mills are doing somewhat better than three or four weeks ago owing to some fair-sized releases of steel for low-priced automobiles. A Cleveland steel plant has put on two additional open-hearth furnaces, and the local mills are operating at 76 per cent of ingot capacity this week, or a gain of six points.

Production in the automotive industry continues to show a slow upward trend. A few of the Michigan manufacturers of medium-priced cars, as well as the Ford and Chevrolet companies, are operating at somewhat better schedules than recently.

The Ford company is credited with placing orders for considerable steel during the week. Included in this company's purchases was about 7000 tons of billets, which are understood to have been placed at a price concession.

A survey of metal-working plants in the northern Ohio territory indicates an average gain of about 6 per cent in operations over a month ago.

Prices have formally declined to 1.70c. to 1.75c., Pittsburgh, for plates and shapes and to 1.75c., Pittsburgh, for steel bars, and the reduction on the latter is being reflected in the steel bar price situation in Cleveland. Sheet prices are still somewhat irregular. Bolts and nuts have been reduced 10 per cent and large rivets \$4 a ton.

**Iron Ore.**—There is little activity in the ore market. Shipments from Lake Erie ports during April were 770,462 tons, compared with 1,676,656 tons during the same month last year. The balance on docks at Lake Erie ports May 1 was 4,334,929 tons, against 3,646,546 tons on May 1, last year. While water shipments from upper Lake ports amounted to 107,559 tons during April, only one cargo reached a lower port during the month, that amounting to 9953 tons, consigned to Buffalo.

**Pig Iron.**—The local quotation on foundry and malleable iron for outside shipment has been reduced 50c. a ton to \$18, furnace. While \$18.50 has been the common asking price for some time, shading to \$18 has been done for shipment to competitive centers. The recent 50c. per ton reduction in price by Cleveland furnaces to \$18.50, furnace, for local delivery has stimulated sales in Cleveland. Prices in Indiana and western Michigan so far have not been affected by the price reduction in Chicago. Quotations on foundry and malleable iron in northern Indiana range from \$18.50 to \$19. The price in western Michigan is \$19, and in the eastern part of the State, \$19.50.

Local producers sold during the week about 4000 tons, the greater part of which was for Cleveland delivery. Sales by another Lake furnace interest totaled 6000 tons. Consumers continue to limit purchases to early requirements. Shipments are only fair, showing little change from

last month. Demand from the automotive industry is still restricted, although a good tonnage is being taken in Michigan by the Chevrolet foundries and by Detroit foundries making malleable castings for Ford cars.

### Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$18.50
S'th'n fdy., sil. 1.75 to 2.25	19.51
Malleable .....	18.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley...	\$26.50 to 27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

**Strip Steel.**—Demand for hot-rolled strip is holding up fairly well and producers of this product as well as of sheets are doing better in their strip than in their sheet mill departments. The market appears to be firm at 1.70c., Pittsburgh, for wide strip and 1.80c. for narrow, with some business in small lots bringing \$2 more. Cold-rolled strip continues very dull, with the price steady at 2.55c., Cleveland. Round-lot buyers of fender stock have been able to get a \$2 a ton concession from the 3.90c. price that has prevailed for some time.

**Rivets.**—Effective May 12, the Champion Rivet Co. reduced large rivets \$4 a ton to \$2.90 a 100 lb., Cleveland and Pittsburgh, and \$3, Chicago and Birmingham. Small rivets are unchanged at 70 and 10 per cent off list. The reduced prices will be applied to outstanding second quarter contracts.

**Plates, Shapes and Bars.**—These products continue to move in rather limited volume, the demand showing little change from week to week. Plates are quieter than bars and shapes. Little business is coming from the railroads and Lake shipyards. A slight improvement is noticeable in inquiry for shapes for building work.

Following a rather unsettled price situation, structural shapes and plates have been reduced \$1 a ton to 1.70c. to 1.75c., Pittsburgh, the lower price being for round lots. Steel bars are now regularly quoted at 1.75c., Pittsburgh, but locally the bar price situation is rather indefinite. The 1.80c., Cleveland, price has not been withdrawn and a lower price is not being openly quoted, although some business has been taken recently at 1.75c.

Consequently, 1.75c. to 1.80c. appears to be a fair representation of the market.

**Sheets.**—Demand holds to the recent moderate volume, with business confined mostly to small lots. Consumers are keeping their stocks very low. While none of the consuming industries is very busy, mills are probably feeling a lack of tonnage more in auto body sheets than in other grades. The market still has a weak tone. Concessions to 2.50c. are reported on black sheets, although some mills are holding to 2.65c. On furniture sheets, the 3.80c. price has become more common. The jobbing mill price on blue annealed sheets seems to be holding to a minimum of 2.15c. for No. 13 and 2c. for No. 10. No concessions are reported on auto body sheets. Galvanized sheets are selling in car lots at 3.25c., which seems to be the minimum price in this market.

**Wire Products.**—The recent price reductions on nails and wire have stabilized the market, but have not stimulated sales. Demand for manufacturers' wire is slow because of the curtailed operations of bolt and nut and other consuming plants.

**Old Material.**—Prices have declined 25c. to 50c. a ton on principal steel-making grades and also on blast furnace scrap. The weakness appears to be largely due to water shipments, which have started from Detroit to Cleveland and are having a depressing effect on the local market. Local activity is confined to small-lot sales to dealers. Shipments to mills are still greatly restricted. Some local scrap is being sold in the Youngstown district, where dealers are paying \$15.50 for No. 1 heavy melting steel and \$15 to \$15.25 for compressed sheet steel.

### Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel...	\$13.00 to \$13.25
No. 2 heavy melting steel...	12.50 to 12.75
Compressed sheet steel...	12.50 to 12.75
Light bundled sheet stampings .....	11.00 to 11.50
Drop forge flashings.....	10.50 to 11.00
Machine shop turnings....	9.00 to 9.50
Short shoveling turnings...	10.50 to 11.00
No. 1 railroad wrought...	13.00 to 13.50
No. 2 railroad wrought...	14.00 to 14.50
No. 1 busheling.....	12.00 to 12.50
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops...	17.75 to 18.00
Low phos., billet bloom and slab crops.....	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap...	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings .....	9.75 to 10.00
Mixed borings and short turnings .....	9.75 to 10.00
No. 2 busheling .....	9.00 to 9.50
Cupola Grades:	
No. 1 cast.....	15.00 to 15.50
Railroad grate bars.....	11.00 to 12.00
Stove plate.....	12.00 to 12.50
Rails under 3 ft.....	18.50 to 19.50
Miscellaneous:	
Rails for rolling.....	16.25 to 16.50
Railroad malleable .....	16.00 to 16.50

# BIRMINGHAM

Plates, Shapes and Bars Reduced \$1 a Ton—Pig Iron Shipments Lag

**BIRMINGHAM, May 13.**—Shipments of pig iron to district consumers are falling slightly behind the April rate, and shipments to outside territories are averaging one-fifth to one-fourth less than 30 days ago. A further decline in the district melt is probable, as some cast iron pipe shops will soon be catching up on orders. Small orders continue to predominate in new business, as melters who have not covered adjust purchases closely to requirements.

The base price of \$14 for No. 2 foundry iron holds firm on district sales. Furnace operations are without change. Of the 17 active furnaces, nine are on foundry iron, six on basic, one on recarburizing iron and one on ferromanganese.

*Prices per gross ton, f.o.b. Birmingham dist. furnaces:*

No. 2 fdy., 1.75 to 2.25 sil.	\$14.00
No. 1 fdy., 2.25 to 2.75 sil.	14.50
Basic	14.00

**Finished Steel.**—Quotations on bars, tank plates and structural shapes have been reduced \$1 a ton to 1.95c., Birmingham. The price range of \$1 a ton has been eliminated in quotations on blue annealed sheets, and only the former minimum figures of 2.25c. for No. 10 and 2.40c. for No. 13 are now quoted.

Incoming business in most lines is still falling behind the output. In those lines here the most active buying season is over, such as rails, sheets and wire products, the orders on books are being rapidly reduced, though it will be some time before material adjustments are made in mill operations. In the active lines, such as bars, plates and structural shapes, the order books are being reduced some, but the forward tonnage is expected to sustain present operations until more active buying begins. Structural steel fabricators report demand to be the lightest of the year. All recent orders have been small.

Active open-hearth last week totaled 19, one less than in the preceding week. The Gulf States Steel

Co. is operating four open-hearths which have just been rebuilt, the capacity of each having been increased from 75 to 90 tons.

**Cast Iron Pipe.**—Demand for cast iron pipe in the Southern territory is spotty, and the aggregate bookings are unimpressive. Projects are slow to develop and indications are that May orders will fall considerably short of those of April. Bids are expected to be called for within 30 days on an important tonnage at Hattiesburg, Miss. A project at Loudon, Tenn., to be let May 21, will require 16,035 ft. of 8-in. pipe and 24,420 ft. of 6-in. pipe. Bids have been opened and awards are pending on small projects at Livingston, Ala., Nashville, Tenn., and Thibodeaux, La. The National Cast Iron Pipe Co. has booked 3000 ft. of 12-in. pipe for Knoxville, Tenn.

Plant operations are at the same level as for last month, but reductions of a few shops are scheduled for this week. Prices are holding at \$37 to \$38.

**Coke.**—Specifications on foundry coke show a tendency to ease up a little. Production remains steady, with 1231 by-product ovens active and 159 idle. The price remains at \$5 a net ton, Birmingham.

**Old Material.**—Large steel mills have slowed up on their requisitions. Except for a light movement of steel scrap, the market is at a standstill. Lack of buying makes prices uncertain.

*Prices per gross ton, deliv'd Birmingham dist. consumers' yards:*

Heavy melting steel	\$13.00 to \$13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron car wheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

## Pacific Coast

Structural Awards Nearly 3000 Tons—Plate Prices Are Firmer

**SAN FRANCISCO, May 10 (By Air Mail).**—The Birchfield Boiler Works booked 400 tons of plates for a pipe line for Tacoma, and the Commercial Boiler Works has ordered an additional 450 tons for a penstock for Seattle. Pending business is light, the largest project involving 375 tons for a pipe line at Everett, Wash.

Structural awards totaled 2896 tons. The Consolidated Steel Corporation secured 415 tons for a telephone building in Los Angeles and the Moore Drydock Co. took 375 tons for a bridge over the Mojave River at

Victorville, Cal. Bids are being taken on 7500 tons for the Aurora Avenue bridge in Seattle, and bids open on May 28 for 615 tons for a bridge over the Salinas River in Monterey County,

**Warehouse Prices, f.o.b. San Francisco**

	Base per Lb.
Plates and struc. shapes	2.45c. to 2.95c.
Soft steel bars	2.40c. to 2.95c.
Black sheets (No. 24)	3.65c. to 4.30c.
Blue ann'd sheets (No. 10)	3.05c. to 3.55c.
Galv. sheets (No. 24)	4.30c. to 4.80c.
Struc. rivets, 1/2-in. and larger	5.65c.
Com. wire nails, base per keg	\$3.40
Cement c'd nails, 100 lb. keg	3.40

Cal. Numerous small awards were reported.

Awards of reinforcing steel bars totaled 1826 tons, and included 400 tons for a Y. M. C. A. building in Seattle and 275 tons for a cold storage warehouse in Tacoma, both placed with the Pacific Coast Steel Corporation.

Plain structural steel remains firm at 2.35c., c.i.f., as does merchant bar steel. Plate prices are firmer and 2.25c., c.i.f., appears to be general. Out-of-stock quotations on reinforcing steel remain unchanged in the San Francisco district at 2.30c., base, in carload lots and at 2.40c. in the Los Angeles district.

**Pig Iron.**—Sales and inquiries were confined to small lots for prompt shipment. Prices are unchanged.

*Prices per gross ton at San Francisco:*

*Utah basic	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

\*Delivered San Francisco.

\*\*Duty paid, f.o.b. cars San Francisco.

**Cast Iron Pipe.**—Bookings totaled 1681 tons. The American Cast Iron Pipe Co. secured 212 tons of 4 to 12-in. Class 150 pipe for Bellingham, Wash., and 400 tons for Victoria and Sanich, B. C. The United States Pipe & Foundry Co. took 309 tons of 6 and 8-in. Class 150 pipe for San Francisco. The Pacific Water Works Supply Co. secured 530 tons of 4 to 12-in. Class B pipe for Renton, Wash. An unnamed interest took 113 tons of 4-in. Class B pipe for San Diego. Bids will be opened on May 20 for 133 tons for Long Beach, Cal.

## Canada

Structural Steel Demand Shows Some Gain

**TORONTO, May 13.**—Pig iron business is holding at a steady level. Contract placing has practically stopped for the present, but spot buying is well sustained. Pig iron production has been increased by the blowing in of the Canadian Furnace Co.'s stack at Port Colborne, which brings the total of active furnaces to seven. Imports are at a minimum owing to the fact that Canadian iron prices are about \$1 a ton under Buffalo quotations on a delivered basis.

*Prices per gross ton:*

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60

Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	22.50

Imported Iron, Montreal Warehouse  
Summerlee .....\$33.50  
Carron .....33.00

**Structural Steel.**—The demand for steel for buildings and bridges has developed some strength during the past week or 10 days. Several fair-



## Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock.....	3.75c.
Black sheets (No. 24).....	4.25c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.30c.
Galv. corrug. sheets.....	4.90c.
Structural rivets.....	4.15c.
Boiler rivets.....	4.15c.
Per Cent Off List	
Tank rivets, 1/4-in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

sized orders were closed and others are pending. Among the orders placed was one for about 4000 tons of steel for a bascule bridge over the Burlington Channel, which went to the Hamilton Bridge Co. The Dominion Bridge Co. also received some good orders during the week.

**Old Material.**—Demand for iron and steel scrap in small lots is holding up well. Prices are unchanged.

### Dealers' buying prices:

	Per Gross Ton	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$8.00	
Rails, scrap.....	11.00	9.00	
No. 1 wrought.....	9.00	11.00	
Machine shop turnings.....	7.00	6.00	
Boiler plate.....	7.00	6.50	
Heavy axle turnings.....	7.50	6.50	
Cast borings.....	6.50	5.00	
Steel borings.....	6.50	6.00	
Wrought pipe.....	6.00	6.00	
Steel axles.....	14.00	17.00	
Axles, wrought iron.....	16.00	19.00	
No. 1 machinery cast.....	16.00		
Stove plate.....	12.00		
Standard carwheels.....	14.50		
Malleable.....	13.00		
Per Net Ton			
No. 1 mach'y cast.....	\$15.00		
Stove plate.....	11.00		
Standard carwheels.....	14.00		
Malleable scrap.....	11.00		

## ST. LOUIS Pig Iron Buying Light—Steel Prices Soft—Scrap Quotations Lower

ST. LOUIS, May 13.—Buying of pig iron continues extremely light. The St. Louis Gas & Coke Corporation sold 1800 tons during the week, the largest order having been 500 tons of foundry iron for an Iowa melter, while a leading Southern maker sold about 250 tons. The Granite City maker's shipments for April amounted to 24,000 tons, a slightly smaller total than in the preceding month of April, last year.

Melters are believed to be well supplied for the remainder of the second quarter, and a feeling of uncertainty as to prices and business is adversely affecting the sale of iron for third quarter delivery. Stove foundries are curtailing operations until there is a heavier movement of the finished product. There are reports of a decrease in melt in some other lines.

### Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill. ....	\$19.00
Malleable, f.o.b. Granite City.....	19.00
N't'n No. 2 fdy., deliv'd St. Louis..	21.16
Southern No. 2 fdy., deliv'd.....	17.42
Northern malleable, deliv'd.....	21.16
Northern basic, deliv'd.....	21.16

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

**Old Material.**—Further declines are reported this week in a weak scrap market. The mills in the district are buying very little, and give no indication that they will be in the market soon except for material for fill-in purposes. Melting steel and rails are said to be at lower prices than at any time since 1921. Heavy melting steel grades are off 50c. a ton, as are miscellaneous standard-section rails, railroad springs, bundled sheets, No. 2 railroad wrought, steel car axles, steel rails less than 3 ft., steel angle bars and agricultural malleable.

Railroad lists are heavy, including: Chesapeake and Ohio, 16,771 tons;

Louisville and Nashville, 12,000 tons; Wabash, 2989 tons; International Great Northern, 2300 tons; Missouri-Kansas-Texas, 1850 tons; St. Louis, San Francisco, 52 carloads; Great Northern, 43 carloads; St. Louis-Southwestern, 38 carloads; Chicago, Indianapolis and Louisville, 28 carloads; Chicago, Milwaukee, St. Paul and Pacific, 18 carloads; Pullman Co. (St. Louis) 10 carloads; Nashville, Chattanooga and St. Louis, nine carloads; Chicago and Eastern Illinois, six carloads.

### Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel.....	\$11.50 to \$12.00
No. 1 heavy melting or shoveling steel.....	11.00 to 11.50
No. 2 heavy melting or shoveling steel.....	10.25 to 10.75
No. 1 locomotive tires.....	14.00 to 14.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart.....	11.50 to 12.00
Railroad springs.....	13.75 to 14.25
Bundled sheets.....	8.00 to 8.50
No. 2 railroad wrought.....	11.00 to 11.50
No. 1 bushing.....	9.75 to 10.25
Cast iron borings and shoveling turnings.....	9.25 to 9.75
Iron rails.....	11.00 to 11.50
Rails for rolling.....	12.50 to 13.00
Machine shop turnings.....	6.75 to 7.25
Heavy turnings.....	9.00 to 9.50
Steel car axles.....	16.00 to 16.50
Iron car axles.....	25.50 to 26.00
Wrot. iron bars and trans.	18.00 to 18.50
No. 1 railroad wrought.....	10.00 to 10.50
Steel rails, less than 3 ft.....	14.00 to 14.50
Steel angle bars.....	11.50 to 12.00
Cast iron carwheels.....	13.50 to 14.00
No. 1 machinery cast.....	13.50 to 14.00
Railroad malleable.....	13.25 to 13.75
No. 1 railroad cast.....	11.50 to 12.00
Stove plate.....	10.00 to 10.50
Relay. rails, 60 lb. and under.....	20.50 to 23.50
Relay. rails, 70 lb. and over.....	26.50 to 29.00
Agricult. malleable.....	12.00 to 12.50

**Finished Steel.**—Buying of plates, shapes and bars continues only fair, and, if anything, in smaller volume than in the preceding week. Prices are reported to be soft, and reports of shadings are heard. The Wabash Railway bought 400 tons of small

## Inland Steel Co. Provides Modern Office Building

IN the completion of a new six-story building for its executive and office personnel, the Inland Steel Co. has provided at Indiana Harbor, Ind., all of the modern devices for the comfort and convenience of its employees. The building will house the works manager, general superintendent, assistant general superintendent, production manager and their staffs and the works auditing, time, engineering and purchasing departments.

On the second and third floors special treatment has been given the ceilings for acoustical effects. Attention has been given on the floor occupied by the engineering and drafting room force to the lighting arrangement with regard to the intensity of light and elimination of shadows.

The building is provided with dining rooms and a kitchen, the latter being equipped with electric ranges.



angles and channels for car repair work at its Decatur, Ill., shops from Chicago mills. Warehouse business so far in May is about up to last

month's volume. The only structural award of the week was 700 tons for a power house at Bagnell, Mo., to Stupp Bros. Bridge & Iron Co.

## BUFFALO Pig Iron Buying Light—Scrap Dull and Weak—Steel Operations Unchanged

**B**UFFALO, May 13.—Inquiries and orders for pig iron are light. Probably not more than 3000 or 4000 tons was placed on the books during the past week, and all of this was in small lots. Most of the inquiry is for less than 100 tons. Shipments on old orders are being maintained, though foundry operations in the district are averaging no more than 50 to 60 per cent. The heater industry, which generally accounts for a large portion of the pig iron sold in this territory, is still carrying inventory from last year.

### Prices per gross ton f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$18.50
No. 2X fdy., sil. 2.25 to 2.75.....	19.00
No. 1 fdy., sil. 2.75 to 3.25.....	20.00
Malleable, sil. up to 2.25.....	19.00
Basic.....	17.50
Lake Superior charcoal.....	27.28

**Finished Steel.**—Mill operations show no appreciable change. The market for fabricated structural steel and reinforcing bars is inactive.

**Old Material.**—There has been no new buying, and two of the large plants are still holding up shipments. The market is sentimentally softer.

### Prices per gross ton f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.....	\$13.75 to \$14.75
No. 2 heavy melting scrap.....	12.25
Scrap rails.....	14.00 to 15.00
Hydraul. comp. sheets.....	12.25
Hand bundled sheets.....	10.00 to 10.50
Drop forge flashings.....	12.25

### Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.95c.
Cold-fin. flats and sq.....	3.65c.
Rounds and hex.....	3.15c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.20
Black wire, base per 100 lb.....	3.50

No. 1 busheling.....	13.75
Hvy. steel axle turnings.....	13.00 to 13.50
Machine shop turnings.....	8.00 to 9.00
No. 1 railroad wrought.....	10.50 to 11.00

### Acid Open-Hearth Grades:

Knuckles and couplers.....	16.50 to 17.00
Coil and leaf springs.....	16.50 to 17.00
Roller steel wheels.....	16.50 to 17.00
Low phos. billet and bloom ends.....	17.50 to 18.00

### Electric Furnace Grades:

Short shov. steel turnings.....	11.50 to 11.75
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### Blast Furnace Grades:

Short mixed borings and turnings.....	10.50 to 11.00
Cast iron borings.....	10.50 to 11.00
No. 2 busheling.....	8.00

### Rolling Mill Grades:

Steel car axles.....	16.50 to 17.00
Iron axles.....	19.50 to 20.00

### Cupola Grades:

No. 1 machinery cast.....	12.50 to 13.00
Stove plate.....	11.50 to 12.00
Locomotive grate bars.....	10.00 to 10.50
Steel rails, 3 ft. and under.....	16.50 to 17.00
Cast iron car wheels.....	11.50 to 12.00

### Malleable Grades:

Industrial.....	16.00 to 16.50
Railroad.....	16.00 to 16.50
Agricultural.....	16.00 to 16.50

### Special Grades:

Chemical borings.....	11.50 to 12.00
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tons of 6 to 12-in. pipe by Wellesley, Mass. Otherwise, business was confined to scattered carlots. It is understood that Massachusetts will be in the market within a fortnight for 2455 tons of pipe, most of it 24-in., and 185 tons of special fittings. Malden, Mass., is taking bids on 170 tons. Pipe prices are still unsettled. While most foundries are openly quoting 6-in. and larger pipe at \$36 a ton, f.o.b. foundry, concessions of \$2 a ton or more can be obtained.

**Old Material.**—Business in all grades is practically at a standstill, and there is no indication that Pennsylvania steel mills will resume buying at an early date. A few carlots of No. 1 heavy melting steel changed hands, mostly at, or very close to, \$9.10 a ton on cars shipping point, some of it for New England and some for eastern Pennsylvania consumption, and scattered small tonnages of steel turnings, borings and mixed borings and turnings were sold. Late this week a local firm will start loading a round tonnage of rails for export, and later in the month another round tonnage of steel will be loaded for an undisclosed port.

### Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$8.75 to \$9.25
Scrap T rails.....	9.00 to 9.25
Scrap girder rails.....	8.00 to 8.25
No. 1 railroad wrought.....	9.50 to 10.00
Machine shop turnings.....	5.00 to 6.50
Cast iron borings (steel works and rolling mill).....	5.00 to 5.50
Bundled skeleton, long.....	8.00 to 8.25
Forge flashings.....	8.00 to 8.25
Blast furnace borings and turnings.....	5.00 to 5.10
Forge scrap.....	7.00 to 8.00
Shafting.....	12.50 to 13.50
Steel car axles.....	15.50 to 16.00
Wrought pipe, 1 in. in diameter (over 2 ft. long).....	8.00 to 8.50
Rails for rolling.....	9.50 to 10.00
Cast iron borings, chemical.....	9.00 to 9.25

### Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$12.00 to \$13.00
No. 1 machinery cast.....	14.50 to 15.00
No. 2 machinery cast.....	13.50 to 14.00
Stove plate.....	10.00 to 10.50
Railroad malleable.....	16.00 to 16.50

## BOSTON Sharp Falling Off in Demand for Most Products—Pipe Prices Still Unsettled

**B**OSTON, May 13.—Pig iron sales have undergone further contraction, with the aggregate falling just short of 2000 tons. Buffalo district furnaces took the bulk of business. A Vermont melter, reported in the market for 500 tons of No. 2X, has not yet bought. A Connecticut foundry contemplating buying a round tonnage of malleable iron has yet to issue an inquiry. Small melters are buying iron only as needed, and then usually by private negotiation.

### Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25.....	\$20.28 to \$21.28
†Buffalo, sil. 2.25 to 2.75.....	20.78 to 21.78
*Buffalo, sil. 1.75 to 2.25.....	20.91 to 21.91
*Buffalo, sil. 2.25 to 2.75.....	21.41 to 22.41
Va., sil. 1.75 to 2.25.....	25.21
Va., sil. 2.25 to 2.75.....	25.71
*Ala., sil. 1.75 to 2.25.....	22.61
*Ala., sil. 2.25 to 2.75.....	23.11
†Ala., sil. 1.75 to 2.25.....	18.75
†Ala., sil. 2.25 to 2.75.....	19.25

Freight rates: \$4.91 all rail and \$4.28 rail and water from Buffalo; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

\*All rail rate.  
†Rail and water rate.

**Reinforcing Bars.**—Bookings in both billet steel and rail steel bars have been confined to scattered carlots and in the aggregate do not exceed 300 tons. The market on billet steel bars is: One to 5-ton lots, 3.06½c. a lb., base, from stock; 5 to 99 tons, 2.56½c.; 100-ton and larger lots, 2.46½c. Rail steel bars are openly quoted at 2.26½c. a lb., base, delivered Boston freight rate points.

**Warehouse Business.**—The failure of local jobbers to cut warehouse prices on wire nails when they revised prices for direct mill shipments was due to the fact that new freight rates of nails will go into effect on May 20. The new rate on nails from Pittsburgh to Boston will be 40c. per 100 lb., contrasted with 36½c. now. Rates to other New England points vary considerably.

**Cast Iron Pipe.**—Orders and inquiries have slumped. The Warren Foundry & Pipe Co. was awarded 575

### Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.....	3.55c. to 5.55c.
Squares and flats.....	4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.

### Per Cent Off List

Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot-pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

\*Including quantity differentials.



# CINCINNATI

## Pig Iron Sales About 5200 Tons— Southern Iron Weak—Scrap Dull

**C**INCINNATI, May 13.—Purchase of 2000 tons of Northern foundry pig iron by a southern Ohio consumer, which has been out of the market for four months, brought the week's sales up to about 5200 tons. This purchase was for delivery through the third quarter.

A central Indiana buyer and a central Ohio buyer each took 500 tons of Northern foundry iron, and a Dayton, Ohio, melter bought 250 tons. A sale of 100 tons of silvery iron to a central Ohio user is reported. Southern iron is weak, with indications that \$13, Birmingham, would not hold on attractive business.

*Prices per gross ton, deliv'd Cincinnati:*  
So. Ohio fdy., sil. 1.75 to 2.25 ..... \$20.89 to \$21.39  
Ala. fdy., sil. 1.75 to 2.25.. 16.69 to 17.69  
Ala. fdy., sil. 2.25 to 2.75.. 17.19 to 18.19  
Tenn. fdy., sil. 1.75 to 2.25. 17.19 to 17.69  
S'th'n Ohio silvery, 8 per cent ..... 26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

**Coke.**—The May volume of new business in coke spurted last week with the closing of three contracts by southern Ohio consumers for the delivery of 16,000 tons of foundry coke to cover second and third quarter needs. Specifications, generally, are lower than in April.

**Finished Material.**—Production by district sheet mills continues at about 50 to 60 per cent of capacity. The automotive demand is low, and railroad tonnage is decreasing slightly. Demand from road construction companies, however, is exceptionally good.

**Old Material.**—Dealers in scrap continue to be cautious, buying only enough scrap to cover contracts. With the market undertone soft, dealers are wary of being caught long on any item. The Louisville & Nashville Railroad is offering a list of 12,000

tons, and the Southern Railway has published its usual list.

*Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:*  
Heavy melting steel.....\$11.25 to \$11.75  
Scrap rails for melting.... 12.50 to 13.00  
Loose sheet clippings..... 8.00 to 8.50  
Bundled sheets ..... 10.25 to 10.75  
Cast iron borings..... 8.00 to 8.50  
Machine shop turnings.... 7.50 to 8.00  
No. 1 busheling ..... 9.50 to 10.00  
No. 2 busheling ..... 6.00 to 6.50  
Rails for rolling..... 13.00 to 13.50  
No. 1 locomotive tires.... 13.50 to 14.00  
No. 2 railroad wrought.... 11.25 to 11.75  
Short rails ..... 17.50 to 18.00  
Cast iron carwheels..... 12.00 to 12.50  
No. 1 machinery cast..... 17.50 to 18.00  
No. 1 railroad cast..... 14.50 to 15.00  
Burnt cast ..... 8.25 to 8.75  
Stove plate ..... 8.25 to 8.75  
Brake shoes ..... 8.25 to 8.75  
Agricultural malleable.... 14.00 to 14.50  
Railroad malleable ..... 15.00 to 15.50

## Detroit Scrap Unchanged

**DETROIT, May 13.**—The local scrap market has a slightly weaker tone, but prices are not quotably lower than those of a week ago.

*Dealers' buying prices per gross ton, f.o.b. cars, Detroit:*  
Hvy. melting and shov. steel.....\$11.25 to \$11.75  
Borings and short turnings 8.00 to 8.50  
Long turnings..... 7.00 to 7.50  
No. 1 machinery cast..... 11.25 to 11.75  
Automotive cast..... 13.50 to 14.00  
Hydral. comp. sheets.... 11.25 to 11.75  
Stove plate..... 9.00 to 9.50  
New No. 1 busheling.... 10.25 to 10.75  
Old No. 1 busheling..... 8.75 to 9.25  
Sheet clippings..... 8.25 to 8.75  
Flashings ..... 10.00 to 10.50

## Weekly Factory Earnings Higher in March

Average weekly earnings in representative New York State factories are reported by the State Industrial Commissioner to have been \$29.90 in March. This was 44c. higher than in February and is the highest figure since last October. It is, however, 45c. below that recorded in March, 1929, and 57c. below the average of last September, which was the highest ever reached. The figures include all employees in both office and shop.

## Highway Construction Shows Large Gain

**WASHINGTON, May 13.**—Highway construction contracts awarded during the first quarter of the current year by 35 States were valued at \$114,101,383, against \$50,910,133 for the corresponding period of last year, a net increase of slightly more than 124 per cent, according to reports received by Secretary of Commerce R. P. Lamont from governors of the States. Pennsylvania, with contracts awarded valued at \$15,469,853 for the first quarter of 1930, against \$2,282,813 for the same period of 1929, leads in dollar value. The increase is 577 per cent.

Secretary Lamont, in pointing to

the importance in the increase in early season highway construction, said that, in addition to facilitating the distribution of the innumerable products of the farms and factories when completed, highway construction operations under way involve millions of tons of material drawn from widely separated sources and that they provide employment both directly and indirectly over broader areas than any other type of public work. He estimated that nearly 50c. of each dollar spent for highway building maintenance is paid for the labor involved.

## Shipbuilding Prospects Good for Three Years

Fair prospects exist for American shipbuilding during the next three years as the result of mail contracts recently awarded, it is pointed out in the annual report of the National Council of American Shipbuilders. After this period, however, shipbuilders must depend for new business on orders for replacement of existing vessels now in service, largely of the cargo type, and all 10 years or more old, the replacement of which should begin at an early date.

As the average life of a vessel is 20 years, the report says, the ultimate replacement program will require about 50 vessels a year, each of 7500 gross tons or its equivalent, 25 for the foreign trade and 25 for the coastal trade, and their construction would give employment to approximately 20,000 workmen each year in the shipyards. Replacement of these vessels, however, it is declared, depends upon further aid by Congress since the Jones-White merchant marine law does not provide for loans for construction of ships of the exclusively cargo type.

## April Building Contracts Largest Since August

Contracts awarded in April for building and engineering projects in 37 States totaled \$483,252,000, according to the F. W. Dodge Corporation. This was the largest monthly amount since last August. It was 6 per cent greater than the figure reported for March, but showed a loss of 25 per cent from the record of April, 1929, when attempts were made in New York to beat the coming into force of new building regulations.

For the first four months awards have reached \$1,580,399,000. Compared with \$1,897,890,000 for the first four months of 1929, the decline was 17 per cent.

For the fourth consecutive month, public works and utilities showed the largest total for any class of building. In April this represented \$149,670,000, or 31 per cent of the total. Residential building, in second place, was \$123,142,000, or 25 per cent.

## Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfrc. bars.....	3.30c.
Rail steel reinfrc. bars.....	3.15c.
Hoops .....	4.05c.
Bands .....	3.50c.
Cold-fin. rounds and hex.....	3.85c.
Squares .....	4.35c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets.....	4.20c.
Small rivets.....	.60 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg (25 kegs or more).....	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.....	10.25
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in..	\$16.50
4-in. ....	34.50
Seamless steel boiler tubes, 2-in....	17.50
4-in. ....	36.00

## Business Gets Back to Sound Basis

(Concluded from page 1448)

to the public. And I am saying again that at one particular place, where our company has a large operation on an absolutely 100 per cent basis on the question of hours and the seven day week, other companies should do the same and reduce unemployment.

Occasionally we encounter each other, I mean the people in our business; and we like to hear pleasant things said; but after all, what we are really concerned about is whether the industry is going to earn a dividend on its common stock in 1930.

I heard a man say the other day that wages should come down. I said, "Oh no, wages are not coming down; you can make up your mind to that fact." I said, "If you are going out to sell your goods and eliminate your profit and expect to get it out of the men in the mills, why, you are greatly mistaken." Then I said, "You make up your mind to one thing, get better prices for your material and get rid of the idea that wages are going down." Because, Mr. President, wages are not going down in the steel industry. That would be just begging the question. We all know that just as soon as they go down, if they should, Mr. Customer gets it. It is like the people who complain about the high Panama Canal tolls; if the Panama Canal tolls were reduced the man in Los Angeles or Portland, Ore., would get the benefit of the reduction and the taxpayers elsewhere would pay for it.

### High Tariff Invites Reprisals

THERE is one other matter that I want to refer to, and that is the question of tariff. The iron and steel industry asked for nothing and got nothing. But the gentlemen in Washington have been in session for several months now, and there has been much in the newspapers about what the steel industry wanted and what it did not want, etc., and of course we have never said anything about it, because we knew in the last analysis that we had not made any demands for anything and we did not get anything.

I do not believe that there is any country on the face of the globe today that can compete against the United States in any market except where there is an arbitrary tariff, a tariff intended to keep everybody out. In Australia they have placed an absolute embargo today on the importation of certain things. Australia is supposed to be a British colony, and yet they bar British goods as well as American goods. Why? Because they are heavily in debt, and they say, "We are going to make our own goods and emerge from this economic situation that we are in."

Canada has been waiting for four

or five months to bring out a budget. The Canadians found out that there was going to be a duty on shingles and a duty on lumber—a bagatelle—in the American tariff, and they slap a duty on iron and steel. British Columbia has 90 per cent of its capital invested by Americans. And yet the Senate and the House have spent days and weeks figuring out how much duty they ought to put on a bundle of shingles and on a thousand feet of board lumber. What happens? Reprisals. A closed market.

## Maizolith—a New Material for Industrial Use

A new material made from cornstalks and corncobs and said to have properties which may suit it for industrial use is described in Bureau of Standards publication No. 108, recently issued. This material, named Maizolith, has been made by the Bureau of Standards and the Iowa State College at their experimental plant at Ames, Iowa.

The color ranges from tan to deep ebony. Tests show volume resistivity of 3,000,000,000 ohms per cc., a tensile strength of about 7000 lb. per sq. in. and compressive strength of approximately 17,000 lb. per sq. in. Suggested uses, in addition to electrical insulating, include gears and pinions, wheels, castors, rollers, bushings, washers, rings, disks, knobs and levers.

Manufacture is simple. Cornstalks or corncobs are reduced to small pieces in a shredding machine, and the shredded particles cooked in a solution of caustic soda. The pulp is then washed and beaten to a jelly, which is boiled to remove air bubbles, placed in a mold and allowed to dry at about 158 deg. Fahr. On drying, the jelly shrinks to about one-fourth its original size, and becomes hard and dense.

Publication No. 108, describing the material, may be obtained from the Superintendent of Documents, Government Printing Office, Washington; the price is 5c.

Polytechnic Institute of Brooklyn will celebrate its seventy-fifth year on June 17 and 18. An anniversary dinner at the St. George Hotel, Brooklyn, has been arranged for the evening of June 17.

## Materials Handling Featured on Radio

The Westinghouse Electric & Mfg. Co. radio program of May 13 included an address by H. V. Coes, Ford, Bacon & Davis, Inc., New York, and chairman of the materials-handling division of the American Society of Mechanical Engineers.

Mr. Coes said in part:

"Materials handling is one of the important factors contributing to increased productivity and enabling higher wages to be paid.

"The public is beginning to appreciate the fact that the cost of living is intimately related to the cost of production and of distribution including, of course, transportation and that one of the prime factors in these costs is the present large toll due to handling, picking up, putting down, rehandling and transporting the materials of agriculture and industry.

"As an example, a manufacturer of agricultural implements in a modern plant, found that he was handling 108 tons of materials for every ton of finished product. In another instance, the rearrangement of the productive equipment and coupling of equipment and processes in a plant manufacturing a standard product reduced handling and rehandling to such an extent that the reduced costs of production were startling.

"It has been estimated that the annual per capita charge due to inadequate materials-handling equipment and methods is \$25 or approximately \$200 to \$250 per family per year.

"Properly applied materials-handling equipment and methods eliminate objectionable, disagreeable and in some cases almost torturing manual labor, and changes the status of the worker in many instances from unskilled to a more efficient, valuable, higher paid employee. Due to higher production, less waste and better quality, costs are lowered, prices to consumers reduced, working hours reduced, wages and purchasing power increased."

A second edition of "Facts and Figures about Structural Steel" has been issued by American Institute of Steel Construction, New York. Over half of this 126-page book is given to a glossary of terms relating to the structural steel industry.

### Sheet-Metal Ware Shipped by Producers (a)

	March, 1930	February, 1930	March, 1929
Enameled ware shipped:			
Dozens .....	341,372	331,915	449,425
Value .....	\$1,287,247	\$1,256,369	\$1,513,039
Three months, dozens .....			1,267,873
Galvanized ware shipped:			
Dozens .....	173,762	161,389	261,065
Value .....	\$677,606	\$623,332	\$920,567
Three months, dozens .....			677,848

(a) United States Department of Commerce.



# Non-Ferrous Metal Markets

## Copper at 13c. Following Heavy Sales—Advance in Lead—Tin Higher

NEW YORK, May 13.

**Copper.**—Within the past week a remarkably quick change has occurred in the copper market. A week ago buyers were still on strike, but the strategy of leading copper producers in lowering prices quickly to a point that attracted a good deal of buying, followed by advances in quotations, resulted in a sharp resumption of demand, which left the market today in a fairly strong position at 13c., delivered, for electrolytic metal. The export price was advanced today to 13.30c. a lb., c.i.f. usual European ports.

Late last week the market was quotable at 12.50c., delivered, but some large sales were made at ¼c. and possibly ½c. under that figure. Having booked a substantial tonnage at the low prices, the copper producers advanced their quotations to 12.75c. Monday morning and later in the day announced a further advance to 13c. Large sales were made at both prices. It is estimated that domestic sales in the week since our last report have totaled 75,000 to 100,000 tons, while sales for export have been around 45,000 tons. Much of the metal sold has been for delivery in the next three months, though buyers have also covered to the end of September in some instances.

Opinion varies in the copper trade as to whether further advances are to be expected. There are some predictions of 14c. copper soon if the demand continues in good volume, while other views are that some producers will be quite content for the present with the 13c. price.

The report on copper stocks, published today, showed a gain of 45,318 net tons during April. That gain brought the total up to 301,338 tons, the largest since October, 1921. At the end of April, last year, stocks were only 57,494 tons. The low point for copper stocks was in October, 1928, when they totaled only 45,648 tons.

Shipments of copper in April declined 24,954 tons, as compared with March. The total for last month was 79,213 tons, while that of March was 104,167 tons. The April, 1929, shipments were 156,759 tons. Production last month in North and South America decreased 2533 tons, and

### THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	May 13	May 12	May 10	May 9	May 8	May 7
Lake copper, New York.....	13.00	12.75	12.50	12.50	12.50	12.50
Electrolytic copper, N. Y.*.....	12.75	12.50	12.25	12.25	12.25	12.25
Straits tin, spot, N. Y.....	32.87½	32.37½	....	31.75	32.12½	32.25
Zinc, East St. Louis.....	4.60	4.60	4.60	4.60	4.65	4.65
Zinc, New York.....	4.95	4.95	4.95	4.95	5.00	5.00
Lead, St. Louis.....	5.50	5.45	5.40	5.40	5.35	5.35
Lead, New York.....	5.60	5.50	5.45	5.45	5.40	5.40

\*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

### Rolled Products

#### List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

<b>Sheets—</b>	
High brass .....	19.75c.
Copper, hot rolled.....	22.75c.
Zinc .....	10.00c.
Lead (full sheets).....	8.25c.
<b>Seamless Tubes—</b>	
High brass .....	24.75c.
Copper .....	25.00c.
<b>Rods—</b>	
High brass .....	18.75c.
Naval brass .....	21.50c.
<b>Wire—</b>	
Copper .....	14.87½c.
High brass .....	20.25c.
Copper in Rolls.....	21.75c.
Brazed Brass Tubing.....	27.25c.

### Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide .....	31.30c.
Tubes, base.....	42.00c.
Rolled rods in coils.....	31.00c.

### Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

<b>Sheets—</b>	Base per Lb.
High brass .....	19.25c.
Copper, hot rolled.....	22.25c.
Copper, cold rolled, 14 oz. and heavier .....	24.50c.
Zinc .....	10.00c.
Lead, wide .....	10.05c.
<b>Seamless Tubes—</b>	
Brass .....	24.25c.
Copper .....	24.50c.
Brass Rods .....	17.50c.
Brazed Brass Tubes.....	26.75c.

### New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass .....	19.75c.
Copper, hot rolled, base sizes.....	22.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	25.00c.
<b>Seamless Tubes—</b>	
Brass .....	24.75c.
Copper .....	25.00c.
Brass Rods .....	18.00c.
Brazed Brass Tubes.....	27.25c.

### New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks .....	10.25c. to 10.75c.
Zinc sheets, open.....	11.25c. to 11.75c.

### Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig.....	34.50c. to 35.50c.
Tin, bar .....	36.50c. to 37.50c.
Copper, Lake .....	14.75c.
Copper, electrolytic .....	14.50c.
Copper, casting .....	14.25c.
Zinc, slab .....	6.25c. to 7.25c.
Lead, American pig.....	6.50c. to 7.00c.
Lead, bar.....	8.00c. to 8.50c.
Antimony, Asiatic .....	10.25c. to 10.75c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) .....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy .....	24.00c. to 25.00c.
Babbitt metal, commercial grade .....	25.00c. to 30.00c.
Solder, ½ and ½ .....	24.00c. to 25.00c.

### Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig .....	37.00c.
Tin, bar .....	39.00c.
Copper, Lake .....	14.50c.
Copper, electrolytic .....	14.50c.
Copper, casting .....	13.00c.
Zinc, slab .....	7.00c. to 7.25c.
Lead, American pig.....	6.38c. to 6.63c.
Lead, bar.....	8.75c.
Antimony, Asiatic .....	14.00c.
Babbitt metal, medium grade.....	17.50c.
Babbitt metal, high grade.....	14.00c.
Solder, ½ and ½ .....	24.00c.

### Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible .....	10.00c.	11.50c.
Copper, hvy. and wire .....	9.75c.	11.25c.
Copper, light and bottoms .....	8.00c.	9.50c.
Brass, heavy .....	5.50c.	6.50c.
Brass, light.....	4.50c.	5.50c.
Hvy. machine composition .....	7.75c.	8.50c.
No. 1 yel. brass turnings .....	5.50c.	6.25c.
No. 1 red brass or compos. turnings.....	7.00c.	7.75c.
Lead, heavy.....	4.00c.	4.62½c.
Lead, tea.....	3.00c.	3.50c.
Zinc .....	2.75c.	3.25c.
Sheet aluminum .....	8.00c.	10.00c.
Cast aluminum .....	7.50c.	9.50c.

totalled 121,998 tons. This was the lowest monthly output since November, 1927.

Total sales of copper since May 1 are estimated at fully 162,500 tons, or more than half of the stocks in hand at the end of April.

**Tin.**—The feature of the tin market was the sharp advance of £4 10s. in London on Monday. This was the result of large buying by the so-called London group. The market here has been only moderately active, total sales in the week since our last report amounting to not more than 750 tons. Current sales are mostly for May and June. Store stocks in England showed an increase of only 17 tons in the week, now standing at 18,593 tons.

Prices here have fluctuated during the week from a low of 31.75c. a lb. to a high of 32.87½c., today's price. This is a gain of less than 1c. in the week. London prices today were £150 2s. 6d. for spot standard; £151 15s. for future standard, and £152 2s. 6d. for spot Straits. The Singapore price was £150.

**Lead.**—Following further strength in the London market, and a fairly firm market here, the American Smelting & Refining Co. today advanced its contract price for lead to 5.60c., New York. The previous quotation was 5.50c. Producers report a fairly active demand, though most of it is for nearby delivery.

**Zinc.**—Prices for zinc remain steady at recent reductions, despite a drop of \$2 a ton in the price of ore at Joplin, Mo. The present ore price, \$33 a ton, is the lowest in years. The

metal price has been unaffected, probably because its decline had more than discounted the drop in the ore price and also because demand has been fairly good. Moreover, some producers are not anxious to sell in large amounts at present, preferring to wait for better prices. Current quotations for prime Western are 4.60c. a lb., East St. Louis, and 4.95c., New York.

**Antimony.**—The market is quiet. Prices are 7.50c. a lb. for spot and 7.62½c. for futures, both duty paid, New York.

**Nickel.**—Ingot nickel in wholesale lots is quoted at 35c. a lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

**Aluminum.**—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c., delivered, the published price.

#### Non-Ferrous Metals at Chicago

CHICAGO, May 13.—Prices for copper are steady, but quotations on tin and zinc are lower. Buying of non-ferrous metals is slightly better than a week ago. The old metal market is quiet.

*Prices per lb., in carload lots:* Lake copper, 13.50c.; tin, 32.75c.; lead, 5.50c.; zinc, 4.75c.; in less-than-carload lots, antimony, 8.60c. On old metals we quote copper wire, crucible shapes and copper clips, 9.50c.; copper bottoms, 8c.; red brass, 8c.; yellow brass, 6c.; lead pipe, 4.25c.; zinc, 2c.; pewter, No. 1, 17.50c.; tin-foil, 20c.; block tin, 26.50c.; aluminum, 8.50c.; all being dealers' prices for less-than-carload lots.

## Reinforcing Steel

### Awards of 12,000 Tons—New Projects Light

**A**WARDS of 12,000 tons the past week included almost 4000 tons for New Jersey road work and 3200 tons for a warehouse in New York. Pending business fell off sharply, totaling 3000 tons compared with 16,000 tons a week ago. Awards follow:

**SOUTH BOSTON,** 117 tons rail steel bars, to a Pennsylvania mill.  
**NEW YORK,** 3200 tons, Adelson warehouse, Hudson and Charlton Streets, to Truscon Steel Co.  
**NEW YORK,** 1200 tons, Vivian & Green Building, Watts Street, to Truscon Steel Co.  
**NEW JERSEY,** 2000 tons, highway, route 25, sections 3 and 4, Arthur McMullen Co., general contractor, to Truscon Steel Co.  
**NEW JERSEY,** 1300 tons, State highway from Jersey City to Kearny, to Truscon Steel Co.  
**WARREN COUNTY, N. J.,** 550 tons, road work, to Kalman Steel Co.  
**SOMERSET COUNTY, N. J.,** 150 tons, causeway, to Igoe Brothers.  
**SEWAREN, N. J.,** 150 tons, superstructure for concrete tanks, Shell Oil Co., to Igoe Brothers.

**CINCINNATI,** 200 tons, work on Cincinnati Union Terminal, to Jones & Laughlin Steel Corporation.  
**ROCKFORD, ILL.,** 300 tons, office building, to Kalman Steel Co.  
**CHICAGO,** 850 tons, apartment building at Junior Terrace and Sheridan Road, to Inland Steel Co.  
**CHICAGO,** 300 tons, Film Exchange, to an unnamed bidder.  
**SPRINGFIELD, ILL.,** 250 tons, public utility substation, to Laclede Steel Co.  
**TACOMA, WASH.,** 275 tons, cold storage warehouse for city, to Pacific Coast Steel Corporation.  
**SEATTLE,** 400 tons, Y. M. C. A. building, to Pacific Coast Steel Corporation.  
**SEATTLE,** 225 tons, West Spokane Street viaduct, to Pacific Coast Steel Corporation.  
**SEATTLE,** 100 tons, Lakeside School for Boys, to Northwest Steel Rolling Mills.  
**OLYMPIA, WASH.,** 120 tons, State bridge over Squallicum Creek, to Pacific Coast Steel Corporation.  
**BELLINGHAM, WASH.,** 120 tons, service building for Puget Sound Power & Light Co., to Pacific Coast Steel Corporation.  
**SACRAMENTO,** 130 tons, bridge over Mojave River at Victorville, to an unnamed bidder.  
**LOS ANGELES,** 150 tons, factory, Twelfth and Stanford Streets, to Badt-Falk Co.  
**LOS ANGELES,** 100 tons, office building, 629 South Hill Street, to Pacific Coast Steel Corporation.

**RIVERSIDE, CAL.,** 100 tons, addition to Hall of Justice, to an unnamed bidder.

**PHOENIX, ARIZ.,** 106 tons, bridges on Florence-Tucson highway, to an unnamed bidder.

### Structural Projects Pending

Inquiries for fabricated steel work include the following:

**NEW YORK CENTRAL RAILROAD,** 245 tons, track elevation at Syracuse, N. Y.; Bates & Rodgers, low bidders on contract.  
**BUFFALO,** 200 tons, public school.  
**AKRON, OHIO,** 100 tons, two bridges.  
**COVINGTON, VA.,** 250 tons, building for Industrial Rayon Corporation.  
**BATTLE CREEK, MICH.,** estimates being prepared, building for Merchants Trust Co.  
**CHICAGO,** 700 tons, Lane Technical High School.  
**JACKSONVILLE, ILL.,** tonnage being estimated, three State institutional buildings.  
**BRIDGEPORT, WIS.,** 175 tons, State highway bridge; bids close May 28.  
**LOS ANGELES,** 129 tons, drainage system No. 29 for Los Angeles County; bids opened.  
**LOS ANGELES,** 124 tons, Verdugo Wash storm drain; bids May 19.  
**LOS ANGELES,** 3500 tons, Fourth Street bridge; general contract awarded, steel not yet placed.  
**SACRAMENTO,** 350 tons, bridge over Salinas River in Monterey County; bids May 28.

### Railroad Equipment

Reading has ordered 10 baggage cars from American Car & Foundry Co.

Republic Steel Corporation is inquiring for 15 to 18 gondola car bodies.

Minneapolis & St. Louis has rejected bids on 500 box cars, and may issue a new inquiry.

Oliver Iron Mining Co. has ordered 10 air dump cars from Magor Car Corporation.

Erie has taken bids on 150 ballast cars and 50 gondola cars.

Weirton Steel Co. has ordered one switching locomotive from American Locomotive Co.

Alton & Southern is inquiring for one or two switching locomotives.

Baltimore & Ohio has ordered two 4-8-2 type locomotives from Baldwin Locomotive Works.

Allquippa & Southern has ordered two switching locomotives from American Locomotive Co.

Chicago, Milwaukee, St. Paul & Pacific has ordered 500 stock cars from General American Car Corporation.

M. A. Hanna Co., Cleveland, has ordered four dump trailer cars from Differential Steel Car Co., Findlay, Ohio.

Various Kansas City offices of the Union Carbide & Carbon Corporation are now housed under one roof in the new 11-story Carbide & Carbon Building at 910 Baltimore Avenue. These units include district offices of Linde Air Products Co., Prest-O-Lite Co., Inc., Oxweld Acetylene Co., and Union Carbide Sales Co. These companies manufacture and distribute everything for oxy-acetylene welding and cutting.



# Fabricated Structural Steel

**Awards Reach Total of 43,000 Tons, Largest Since March—  
New Projects Also Increase with 37,000 Tons**

THE gain in structural steel awards which began the last week in April, but declined a week ago, has been resumed, with a total of about 43,000 tons, the largest since February. New projects also show an increase, totaling about 37,000 tons.

Among the larger awards were 8000 tons for a power plant at Kansas City, Mo., 6000 tons for a New York subway section and 3000 tons in a telephone building at Louisville, Ky. New projects include 5000 tons each for an addition to a Chicago power station, an express terminal building, also in Chicago, and a highway bridge at Clarendon, Ark. Awards follow:

HANOVER, MASS., 300 tons, standpipe and tanks, to Pittsburgh-Des Moines Steel Co.  
BOSTON, 500 tons, State office building, to Palmer Steel Co.  
STATE OF NEW HAMPSHIRE, 350 tons, highway bridge, to American Bridge Co.  
NEW YORK, 1500 tons, apartment at Seventy-ninth Street and West End Avenue, to Easton Structural Steel Co.  
NEW YORK, 6000 tons, subway section 3, route 103, to American Bridge Co.  
NEW YORK, 1000 tons, loft building Sixth Avenue and Houston Street, to McClintic-Marshall Co.  
BROOKLYN, 1400 tons, Brooklyn State Hospital, to B. Shaet & Sons.  
ERIE, PA., 780 tons, Warner Brothers theater, to American Bridge Co.,  
CLEVELAND, 1000 tons, Carnegie Medical building, to Austin Co.  
TOLEDO, OHIO, 1400 tons, DeVilbiss School, to an unnamed fabricator.  
TOLEDO, 100 tons, Surface Combustion Co., to Hiner Structural Steel Co.  
BALTIMORE, MD., 800 tons, Baltimore & Ohio Products Terminal Building, to Dietrich Brothers.  
KNOXVILLE, TENN., 100 tons, airplane hangar, to Ingalls Iron Works Co.  
LOUISVILLE, KY., 3000 tons, Southern Bell Telephone Co. building, to McClintic-Marshall Co.  
PITTSBURGH & WEST VIRGINIA RAILROAD, 2825 tons, bridge work, to American Bridge Co.  
TURTLE CREEK, PA., 195 tons, bridge to McClintic-Marshall Co.  
BEAVER FALLS, PA., 175 tons, theater, to Pittsburgh Bridge & Iron Co.  
MOUNDSVILLE, W. VA., 235 tons, building for Fostoria Glass Co., to Pittsburgh Bridge & Iron Co.  
PITTSBURGH, 300 tons, three barges for Ruprecht Co., St. Louis, to Dravo Contracting Co.  
DAYTON, OHIO, 8000 tons, track elevation for Dayton Municipal Railway Co., to American Bridge Co.; previously reported as 7000 tons.  
DETROIT, 885 tons, Pere Marquette grade crossing separation at Dix Avenue, to American Bridge Co.  
DETROIT, 1460 tons, plate work for Ford Motor Co., to Whitehead & Kales Co.  
MILWAUKEE, 400 tons, addition for Heil Co., to McClintic-Marshall Co.  
MILWAUKEE, 2500 tons, administration building, for A. O. Smith Corporation, to Wisconsin Bridge & Iron Co.  
RACINE, WIS., 400 tons, municipal building, to Wisconsin Bridge & Iron Co.  
MILWAUKEE ROAD, 500 tons, bridges, to an unnamed fabricator.  
HARDIN, ILL., 2000 tons, highway bridge, to Illinois Steel Bridge Co., Jacksonville.  
EAST MOLINE, ILL., tonnage not stated, Deere & Co., to Iowa Steel & Iron Co.  
BAGNELL, MO., 700 tons, power house for Union Electric Light & Power Co., to Stupp Brothers Bridge & Iron Co.

TULSA, OKLA., 600 tons, Union Station, to Patterson Steel Co.  
KANSAS CITY, MO., 8000 tons, power plant for Kansas City Power & Light Co., to an unnamed bidder.  
SEATTLE, 450 tons, plates, addition for penstock, Lake Cushman project, to Commercial Boiler Works.  
SEATTLE, 100 tons, plates, 17 tanks for Union Oil Co., to Seattle Boiler Works.  
SEATTLE, 126 tons, warehouse for Grinnell Co., to Isaacson Iron Works.  
TACOMA, WASH., 400 tons, plates, 52-in. riveted pipe, to Birchfield Boiler Works.  
TACOMA, 350 tons, two boilers for city steam plant, to Puget Sound Machinery Depot.  
MONROE, WASH., 180 tons, addition to State Reform School, to Hofius Steel & Equipment Co.  
ST. HELENS, ORE., 100 tons, pulp plant addition, to Truscon Steel Co.  
OAKLAND, CAL., 150 tons, Money-Back Smith store, to Judson-Pacific Co.  
CROCKETT, CAL., 250 tons, pipe supports for California-Hawaiian Sugar Co., to Moore Dry Dock Co.  
SACRAMENTO, 375 tons, bridge over Mojave River at Victorville, to Moore Dry Dock Co.  
LOS ANGELES, 415 tons, telephone building, to Consolidated Steel Corporation.  
SAN FRANCISCO, 140 tons, two bridges for Southern Pacific Co., at Norden and Coyote, Cal., to an unnamed bidder.

## Structural Projects Pending

Inquiries for fabricated steel work include the following:

LOWELL, MASS., 150 tons, high school.  
INDIAN ORCHARD, MASS., 265 tons, addition for Chapman Valve Mfg. Co.  
BURLINGTON, VT., unstated tonnage, museum for University of Vermont.  
WORCESTER, MASS., unstated tonnage, Post Office and Court House.  
NEW YORK, 3000 tons, addition to Psychopathic building, Bellevue Hospital.  
NEW YORK, 200 tons, addition to Canadian National Railways building.  
NEW YORK, 200 tons, commissary building for Bickford's Cafeteria; former bids rejected and new bids being taken.  
NEW YORK, 250 tons, remote control substation for New York Central Railroad at Dyckman Street.  
NEW YORK, unstated tonnage, viaduct for New York Central Railroad on West Sixty-fifth Street.  
AMSTERDAM, N. Y., unstated tonnage, two public schools.  
POUGHKEEPSIE, N. Y., 100 tons, grade crossing elimination for New York Central Railroad.  
POUGHKEEPSIE, 100 tons, music building for Vassar College.  
STATE OF NEW YORK, 1000 tons, highway bridges.  
PHILADELPHIA, 1500 tons, Medical Tower building on Seventeenth Street.

ALLENTOWN, PA., 250 tons, Americus Hotel.  
CLARK SUMMIT, PA., 1000 tons, hospital building.  
STATE OF PENNSYLVANIA, 150 tons, highway bridges.  
SEABOARD AIR LINE, 1500 tons, bridge at Petersburg, Va.  
BATTLE CREEK, MICH., 1430 tons, bank.  
CLEVELAND, 200 tons, West Fifty-third Street grade crossing elimination for Big Four Railroad.  
COVINGTON, VA., 1200 tons, factory buildings for Industrial Rayon Corporation.  
YOUNGSTOWN, 150 tons, service building for Firestone Tire & Rubber Co.  
CHICAGO, 5000 tons, addition to State Line Generating Co.'s power station; bids to be taken in June.  
CHICAGO, 5000 tons, express terminal building for Chicago & North Western.  
CHICAGO GREAT WESTERN, 2500 tons, bridge work.  
CLOQUET, MINN., 1000 tons, building for Northwest Paper Co.  
MILWAUKEE, 1000 tons, laboratory and research building for A. O. Smith Corporation.  
BRIDGEPORT, WIS., 1450 tons, State highway bridge; bids close May 28.  
SIOUX FALLS, S. DAK., 800 tons, viaduct.  
CLARENDON, ARK., 5000 tons, highway bridge.  
EVERETT, WASH., 100 tons, plates, two steel tanks; Seattle Boiler Works low bidder.  
SEATTLE, 7500 tons, Aurora Avenue bridge; bids being taken.  
SEATTLE, 114 tons, two steel towers over Duwamish Waterway; bids May 16.  
SACRAMENTO, 615 tons, bridge over Salinas River; bids May 28.

## Freight Rate Decisions

WASHINGTON, May 13.—The Interstate Commerce Commission has authorized rates on iron and steel products, including pipe, from the Pittsburgh district to points in Arkansas, Oklahoma, Texas and a portion of Louisiana west of the Mississippi River over the American Barge line to Memphis, Tenn., and rail connections beyond on the basis of 11c. per 100 lb., less than the all-rail rates. It is provided that rates to higher-rated intermediate points shall not exceed rates constructed on the basis of 11c. per 100 lb., under the all-rail rates to the same points and shall not exceed the lowest combination of rates.

Railroads have been authorized by the Interstate Commerce Commission to establish rates on wire and wire articles from points in New England Freight Association territory on or before May 20 in compliance with the scales fixed in the general iron and steel rate case. By this decision rates on manufactured iron and steel were adjusted throughout Official Classification territory. The New England mileage scale carries rates 10 per cent above the Central Freight Association scale.

Complaints against rates on by-product coke in Central Freight territory have been filed with the Interstate Commerce Commission by a number of iron and steel and other corporations.

# Changes in Iron and Steel Manufacture

Fewer Workers and Larger Units Are Features—Large Increase in Power Elements—Sharp Decline in Some Processes

**W**HILE much of the data contained in the biennial reports of the Census of Manufactures is purely statistical and of interest primarily for reference, there is nevertheless a large amount of information issued by the Census Bureau showing the general trend of the industry, not only with regard to matters of production and other subsidiary items, but also with regard to the direction of certain changes within the industry which to the average executive may not be so apparent in the day-by-day passing as it becomes on the basis of these surveys, two years apart.

It will be no news perhaps that the number of wage earners in the industry has been decreasing. This follows as a direct corollary of the great expansion of mechanical handling and processing equipment, and is in line with industry in general. From 416,748 wage earners in 1919 and 424,913 in 1923 there has been a drop to 389,270 in 1927. In eight years the drop was 6.6 per cent.

Along with this reduction in the human element has come a decided increase in the power of prime movers installed, which have gone up from just under 6,000,000 hp. in 1923 to 6,781,000 hp. in 1927. This represents a gain of 13 per cent. Much more striking is the increase in the number and

power of electric motors installed, which have increased from 3,800,000 hp. in 1923 to 5,229,000 hp. in 1927, a gain of 39 per cent. The number of motors has advanced from 110,540 to 147,336, the average power per motor having been about 35 hp. in both 1923 and 1927.

## Blast Furnace Operations

With the steady decrease in production of charcoal iron over the past decade, the number of establishments with such equipment having declined from 19 in 1919 to 8 in 1925 and 1927. The number of wage earners has declined from 1440 in the earlier year to 437 in 1927, the reduction having been no less than 69.7 per cent. Wages have shown a still further shrinkage of 72.3 per cent and the value of products has declined 64.3 per cent in the eight years.

Census reports on the value of pig iron at the furnaces show a steady decline from an average of \$24.59 a ton in 1921 to \$19.01 in 1927. In the table which covers this point will be found a comparison with the average composite prices of THE IRON AGE for pig iron during those same years.

In the census statement the figures are broken down into coke pig iron and charcoal pig iron. The latter shows a steadily declining value from an average of \$32.53 a ton in 1921 to

\$24.39 in 1927. These figures are compared at the same time with THE IRON AGE quotations on Lake Superior charcoal iron reported from Chicago.

There has been an increase in the proportion of the total amount of pig iron delivered molten, this having been 61.4 per cent of the aggregate in 1923, going up to 64.9 per cent in 1925 and declining to 63.5 per cent in 1927. The increase has been at the expense of sand-cast pig iron, which has dropped from 8.5 per cent in 1923 to 4.8 per cent in 1925 and 3.6 per cent in 1927. The amount cast in pig machines was about 28.8 per cent in both of the earlier years, increasing to 31.2 per cent in 1927. Other amounts, between 1 and 2 per cent each year, are represented by chilled cast iron and direct castings.

As has been outlined from time to time in THE IRON AGE, there has been a fairly steady decline in the number of blast furnaces active or potentially active. The census figures showed a drop from 368 in 1923 to 310 in 1925 and 292 in 1927. In spite of this decline in total number, however, there has been a substantial increase in the number of furnaces rated at 500 tons and upward, which have advanced from 152 in 1923 to 162—somewhat more than one-half the total—in 1925 and 172—almost 60 per cent—in 1927. There has, of course, been a further in-

## Dollar Value of Pig Iron Production (United States Census Report)

	1927	1925	1923	1921
Total output(a).....	\$688,642	\$744,734	\$984,983	\$408,582
Average(b).....	19.01	20.41	24.52	24.59
Composite(c).....	18.55	20.58	26.30	22.58
Coke pig iron(a).....	684,556	739,585	977,253	405,531
Charcoal iron(a).....	4,086	5,149	7,730	3,051
Coke average(b).....	18.98	20.37	24.49	24.54
Charcoal average(b).....	24.39	26.31	30.40	32.53
Charcoal iron(d).....	27.04	29.04	33.22	35.96

(a) Thousands of dollars.  
(b) Dollars a gross ton.  
(c) THE IRON AGE composite price for pig iron.  
(d) THE IRON AGE quotations at Chicago for Lake Superior charcoal iron.

## Blast Furnaces in the United States

	1927		1925		1923	
	Capac- ity	Aver- age	Capac- ity	Aver- age	Capac- ity	Aver- age
Total.....	292	142,016	486	310	136,086	439
Rating:						
600 tons and up..	97	64,067	660	47	29,368	625
500 to 599..	75	29,039	521	115	59,964	521
400 to 499..	48	20,830	434	51	22,408	439
300 to 399..	34	11,367	334	44	14,539	330
200 to 299..	20	4,805	240	28	6,702	239
Under 200(b)...	18	1,910	106	25	3,104	124

(a) Daily, in gross tons. (b) Includes charcoal furnaces, 8 plants in 1927 and 1925 and 14 in 1923.

## Iron and Steel Industry: Its Magnitude

(Reported by United States Census Bureau for "Blast Furnaces" and "Steel Works and Rolling Mills")

	1927	1925	1923
Establishments.....	602	595	658
Wage earners.....	389,270	399,914	424,913
Wages paid(a).....	\$645,534	\$660,297	\$696,761
Average wage.....	1,658	1,651	1,639
Value added by manufac- ture(a)(b).....	1,219,534	1,281,976	1,289,910
Horsepower used.....	6,781,053	6,143,927	5,999,941
Electric motors, no.....	147,336	128,510	110,540
do. hp.....	5,229,206	4,143,914	3,799,588
do. average hp. ....	35.5	32.2	34.4
Steel furnace capacity(c):			
Daily.....	214,228	212,034	193,247
Annual.....	66,624,908	65,942,574	60,099,817
[American Iron and Steel Institute:			
Annual.....	61,465,100	57,812,531	59,431,710
Open-hearth furnaces.....	1,150	1,141	1,135
Daily capacity(c).....	159,908	151,894(d)	131,658
Converters.....	95	102	105
Daily capacity(c).....	48,667	55,289	57,723
Electric furnaces.....	219	178	156
Daily capacity(c).....	5,357	4,461	3,217
Metal mixers.....	88	90	90
Capacity(c).....	48,039	44,611	43,660

(a) Thousands of dollars. (b) Value of products, less cost of materials, supplies, fuel and power. (c) Gross tons. (d) Revised.



crease subsequent to the census report.

Along with this increase in the large-size furnaces has come a sharp decrease in those of smaller size. Furnaces of less than 500 tons daily capacity numbered 216 in 1923, declining to 148 in 1925 and to 120 in 1927. Thus, in a period of four years the number of furnaces of less than 500 tons was cut almost in half. In units of under 400 tons, the reduction has been more than 50 per cent, from 161 furnaces in 1923 to only 72 in 1927.

#### Steel Works and Rolling Mills

Since 1921 the number of establishments producing alloy steel has almost doubled, going from 66 in that year to 128 in 1927. The production in tons has been almost quintupled, partly because of the extremely poor production conditions in 1921. Compared with 1923, however, there is an increase of almost 80 per cent in output of alloy steel.

Capacity of steel furnaces in active plants as reported by the Census Bureau differs considerably from the figures of the American Iron and Steel Institute. The census figures exceed those of the institute in each of the four years under review and exceed them markedly in the two most recent years, both affected by the revised set-up of capacity by the institute. These figures are shown in an appended table. Production during the year, on the basis of the Census Bureau's capacity figures, has varied between 32 per cent in 1921 and 74 per cent in 1923, showing 69 per cent in 1925 and 67 per cent in 1927.

In the same table are the number and gross and unit capacities of the principal types of steel melting furnaces and of mixers.

Of the total number of persons engaged in the iron and steel industry in 1927, 39 per cent were in Pennsylvania, Ohio took second rank, with 22 per cent of the aggregate, followed by Indiana with 8 per cent, and Illinois with 7 per cent. No other State reached 5 per cent.

There has been a steady decline in the number of dipping sets for tin plate andterne plate over the period covered by the census figures. Tin plate machines have dropped from 852 in 1921 to 765 in 1923, 525 in 1925 and 475 in 1927, 356 in the latter year being mechanically fed. In the meantime, theterne plate sets have dropped from 51 in 1921 to 42 in 1927. In spite of this reduction in number of sets, there has been a steady increase in the total daily capacity, indicating a sharp increase in the average capacity per set.

J. M. & L. A. Osborn Co., Buffalo, has purchased the sheet metal jobbing stock of the Republic Metalware Co., Buffalo. The Republic Metalware Co. will continue to manufacture kitchenware and kindred house-furnishings, while the Osborn Company will carry on distribution of sheet metal and sheet metal workers' supplies.

## Chicago-Milwaukee Rate to Stand

### Interstate Commerce Commission Will Not Permit Reduction to Meet Waterway Competition

WASHINGTON, May 13.—The refusal of the Interstate Commerce Commission to permit the railroads to establish a rate of 8c. a 100 lb., minimum 80,000 lb., to alternate with the present rate of 9.5c., minimum 36,000 lb., on iron and steel products from the Chicago district to Milwaukee, Kenosha, and Racine, Wis., and intermediate points brought to an unsuccessful conclusion efforts of the carriers to divert this traffic from water lines. The proposed reductions were opposed by the American Rolling Mill Co., Middletown, Ohio, the East Side Manufacturers' Association, Granite City, Ill., the Laclede Steel Co., St. Louis, and the Association of Commerce, Green Bay, Wis.

The protestants contended that they would be unduly prejudiced and Chicago shippers unduly preferred if the rates were allowed to go into effect. In upholding this point, the commission said that it is unlawful for any carrier to subject any shipper, locality, or particular description of traffic to any undue or unreasonable prejudice or disadvantage. It was stated that the maintenance of a rate from the Chicago district to Milwaukee, which is from 75 to 156 per cent below what it had found to be reasonable maxima, would subject shippers located at such points as Alton and East St. Louis, Ill., to undue or unreasonable prejudice or disadvantage.

"The fact that shippers located in the Chicago district may ship by water at a rate as low as that proposed does not relieve respondents of their obligations . . . for the provisions . . . apply specifically to them and have no application to water carriers which are not subject to our jurisdiction," the commission said.

#### Growing Use of Water Routes

The decision said that industries at Milwaukee, Racine and Kenosha use approximately 1,000,000 tons of steel annually and that the bulk of the tonnage comes from the Chicago district. It was estimated that there are 30 boats equipped for handling iron and

steel products plying the Great Lakes and that peddler boats and barges of from 350 to 500 tons' capacity are also available. In 1928, the decision said, 17,481 tons of iron and steel was received in Milwaukee by boat lines. During eight months of that year, it was pointed out, the Illinois Steel Co. shipped 100,000 tons to various ports of the Great Lakes by water.

Competing steel plants at Buffalo, Cleveland and Toledo use water transportation, the decision explained, and this fact is said to have a tendency to compel the plants in the Chicago district also to transport by water. Steel can be shipped by water from Buffalo to Milwaukee for \$1 a net ton, it was stated. During April, 1929, as an experiment, the decision continued, the largest receiver of iron and steel in this destination territory shipped 17,250 tons by boat from the plant of the Illinois Steel Co., at Gary, Ind., to Milwaukee. This tonnage moved in four boat loads and the cost from the mill to the consuming plant was \$1.355 a net ton. This figure includes a switching movement at origin and destination and marine insurance.

The cost by boat from mill to industry at Racine was estimated at \$1.31 a net ton in cargo lots of 3000 tons and \$1.46 a net ton in cargo lots of 2000 tons. It was testified that under charter these costs could be reduced from 15c. to 35c. a net ton and that return cargoes of scrap iron and steel could be provided and thus further reduce the costs. Representatives of numerous receivers and consumers of iron and steel at Racine said it was their intention to use the water facilities in the event the present rate remained in effect.

Southern Manganese Steel Co., St. Louis, will no longer be operated as a subsidiary of the American Manganese Steel Co., Chicago Heights, Ill., having become a part of that company, and will be known hereafter as the Southern Manganese Steel Division of the American Manganese Steel Co.

#### More Railroad Equipment Produced in April

	April, 1930	March, 1930	April, 1929
Steam locomotives shipped (a) . . . . .	97	68	61
Of which, electric . . . . .	0	2	2
Four-month total . . . . .	280	.....	142
Of which, for export . . . . .	8	.....	15
Unfilled orders . . . . .	464	535	495
Of which, for export . . . . .	3	6	52
Trackwork produced (b), net tons . . . . .	13,508 (c)	13,096	16,815
Four months . . . . .	50,958	.....	54,266

(a) United States Department of Commerce.

(b) American Iron and Steel Institute; the figures are for Tee-rail track of 60 lb. or more to the yard.

(c) Largest total since last August.

# Exports of Tractors

Six Times as Many Shipped Abroad in 1929 as in 1922 While Production Doubles

**D**URING the past five years approximately 30 per cent of the tractors made in the United States have been exported. This compares with about one-half that proportion of the smaller production of the three preceding years. These facts are brought out in a statement of the Department of Commerce, from which the accompanying table has been prepared and the diagram at bottom of page made.

Output has risen from 100,000 units in 1922 to 221,000 in 1929. Only two years during that period showed a smaller output than the previous years, those being 1924 and 1928. The values have risen faster than the

number, owing apparently to larger production of heavier units. Thus, the average tractor produced in 1922 had a wholesale value of about \$532. Those produced in 1929 averaged nearly \$900.

Canada has been the leading export market in every year under survey, with the exception of 1924, 1925 and 1926. Russia, which took less than 2 per cent of the output in the first three years of the eight-year period, has been in either first, second or third position in each of the last five years, having been second only to Canada last year. Argentina and Australia are the other consistently large markets, although a spurt of

buying from Italy, four or five years ago, placed that country first in 1925 and third in 1926.

## Porcelain Enamel Makers to Advertise Nationally

A meeting of the manufacturers of porcelain enamel products was held at the Hotel Cleveland, Cleveland, May 8, to discuss a cooperative national campaign for advertising and promoting the sale of their products. The meeting was attended by about 65 manufacturers of porcelain stoves, refrigerators, kitchen and bath tub wall tile, sinks, cooking utensils and metal signs.

Bennett Chapple, vice-president, American Rolling Mill Co., Middletown, Ohio, one of the speakers, visioned the homes and skyscrapers of the future as being built of steel and surfaced in vitreous porcelain enamel of all colors. He predicted that in the future there will be all steel bathrooms which will be assembled like automobile bodies and shipped to a job in one piece. This would necessitate welding the tub and other fixtures into the room and spraying the entire unit with porcelain enamel. Other speakers were R. D. Landrum, American Ceramic Society; James L. Hubbell, president, Cleveland Advertising Club, and William Ganson Rose, head of the William Ganson Rose Organization, Cleveland.

It was decided to appoint a coordinating committee to work with the individual manufacturers through the various stove, kitchenware, sign and other porcelain enameled associations in making plans for a three-year campaign. This campaign, according to the plans, will be participated in not only by manufacturers of porcelain enamel wares but by makers of enamels and by suppliers of chemicals for the industry.

The committee appointed consists of: Chairman, Robert A. Weaver, editor, the *Enamelist*, and president, Ferro Enamel Supply Co., Cleveland; Bennett Chapple, vice-president, American Rolling Mill Co., Middletown, Ohio; William Hogensen, vice-president, Chicago Vitreous Enamel Products Co., Cicero, Ill.; Robert D. Landrum, manager, Titanium Alloy Mfg. Co., Cleveland; L. S. Hamaker, advertising manager, Republic Steel Corporation; W. A. Harshaw, president, Harshaw Chemical Co., Cleveland; F. S. Earnshaw, secretary, U. S. Stamping Co., Moundsville, W. Va., also representing kitchenware manufacturers in the Metalwares Institute; C. T. Aaron, president, National Gas Range Manufacturers Association, Beckwith, Mich., representing gas range associations; Louis Ingram, Ingram-Richardson Co., Beaver Falls, Pa.; George Haines, Porcelain Tile Co., Chicago; R. W. Staud, Benjamin Electric Products Co., Chicago; C. A. Paeschke, Geuder, Paeschke & Frey Co., Milwaukee; Frank Jones, Jones Hospitalware Co., West Lafayette, Ohio.

UNITED STATES PRODUCTION AND EXPORTS OF TRACTORS						
	Production		Exported		Number to	
	Number	Value*	Number	Value*	Canada	Russia Other
1922	100,088	\$53,243	10,214	\$7,663	4,759	26 (a)
1923	135,210	93,783	20,570	14,862	6,017	356 (b)
1924	120,823	88,581	25,221	17,929	2,066	361 (c)
1925	167,590	121,302	45,946	32,596	5,368	6,760 (d)
1926	181,995	145,912	51,242	37,295	8,320	9,703 (e)
1927	200,504	159,531	58,275	45,688	16,218	5,119 (f)
1928	171,469	162,086	57,865	61,393	21,837	5,083 (g)
1929	221,200	193,324	60,804	75,225	17,189	12,421 (h)

\*Thousands of dollars.

(a) Argentina, 1813.

(b) Australia, 2842; Argentina, 2164.

(c) Australia, 4101; Argentina, 2530.

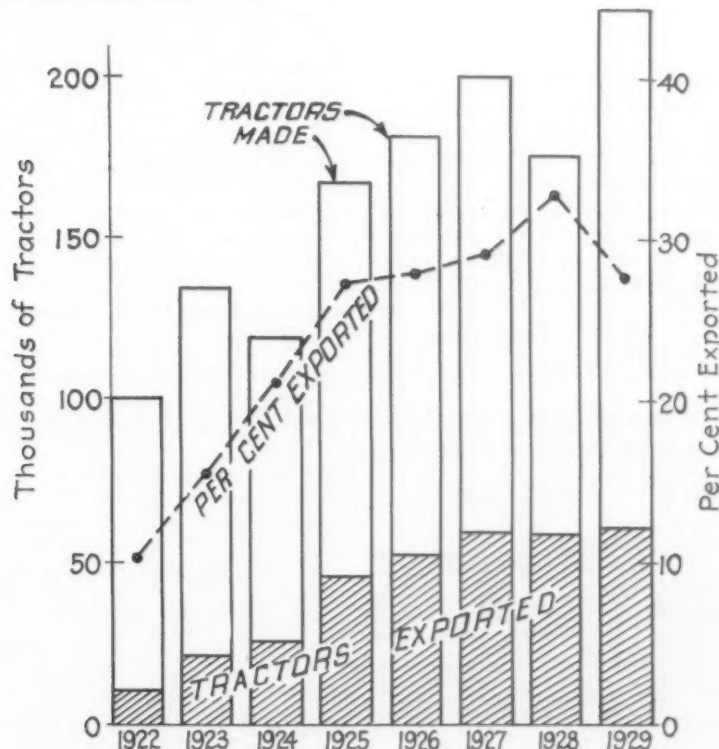
(d) Italy, 7066.

(e) Italy, 7852.

(f) Germany, 5743.

(g) Australia, 5137.

(h) French North Africa, 2750.



Exports of Tractors Have Multiplied by Six Since 1922, Whereas Production Has Not Much More Than Doubled



# Steel Cartel to Restrict Output

Reduction of 25 Per Cent Suggested—Stainless Steel Patent Holders Consider International Agreement

(By Cable)

LONDON, ENGLAND, May 12.

THE Continental Steel Cartel will meet May 16 to discuss further curtailment of output by 25 per cent. The Continental Wire Rod Cartel meets in Brussels May 18, to discuss prices and output. Negotiations are reported to be proceeding for the establishment in London of an international sales office for semi-finished steel.

The British iron and steel situation is becoming worse and the Palmers Shipbuilding & Iron Co. is blowing out its Jarrow furnaces, reducing the number of North-East coast stacks to 35 of a total of 93.

Scottish makers have blown out one furnace. Pig iron producers had anticipated a revival of demand after the Easter holidays, but consumers are still holding for lower prices. Furnace stocks are accumulating, but Cleveland prices are unchanged although hematite quotations are easier.

Finished steel producers are seeking substantial orders unsuccessfully and some have been obliged to suspend because of lack of tonnage. The general outlook is unfavorable as few new shipbuilding contracts have been placed.

British pig iron exports in April were 23,000 tons, of which the United States received 100 tons. Total exports of iron and steel were 268,000 tons.

Continental iron and steel here is dull, especially semi-finished material. Consumers are unable to dispose of their own products and with heavy stocks are pressing for suspension of

Lower Copper Price Expected to Regain European Markets Lost to Aluminum.

\* \* \*

Continental Steel Mills Circumvent Cartel Prices by Refunds and Large Cash Discounts

\* \* \*

Cartel of British and German Stainless Steel Patent Holders Considered as Means to Reduce World Competition.

\* \* \*

European Car Builders to Seek an Agreement with American Companies on South American Business.

## Lower Copper Price Affects Aluminum

HAMBURG, GERMANY, April 28.—Heavy copper purchases by German consumers have followed the recent reduction in the price. Stocks had been reduced to the lowest level in years, as consumers delayed purchases in expectation of the reduction. It is now believed that the Continental Aluminum Cartel will reduce the price of aluminum, which has been at £95 a metric ton (20.97c. a lb.) for about three years. The reduction in the aluminum price, which will probably be decided upon during May, probably will be £5 to £6 a metric ton (1.10c. to 1.32c. a lb.). The lower copper prices are expected to regain for copper certain markets which had been lost to aluminum when copper prices reached such a high level.

## Stainless Steel Cartel in Prospect

DUSSELDORF, GERMANY, April 26.—Renewal of the agreement between the Friedrich Krupp A. G. in Germany and Thomas Firth & Sons, Ltd., and Brown Bayley's Steel Works, Ltd., in England, limiting stainless steel competition in certain markets, has occasioned considerable surprise. It is now understood that other British producers of stainless steel have entered into the renewed agreement. As makers in other countries are in many cases operating under licenses from the German or British patent holders, a large part of the stainless steel output of the

further deliveries. Most Continental mills are seeking orders, but prices are maintained although unofficial shading is reported in several instances.

Tin plate continues active without any large buying, but a fair general demand, so that makers' position is sound.

Galvanized sheets are dull. Works are in need of orders but are maintaining prices. Black sheets are quiet with Far Eastern demand for light gage sheets negligible.

French output in March was 899,000 metric tons of pig iron and 849,000 tons of raw steel. There were 152 blast furnaces active at the end of March.

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.8665 (par)

### British Prices f.o.b. United Kingdom Ports

Ferromanganese, export.	£10 15s.	to £11 15s.	\$52.30 to \$57.17
Billets, open-hearth.....	6 0	to 6 10	29.20 to 31.63
Black sheets, Japanese specifications .....	12 5		59.61
Tin plate, per base box..	0 18½	to 0 18½	4.46 to 4.50
			Cents a Lb.
Steel bars, open-hearth..	8 0	to 8 10	1.74 to 1.85
Beams, open-hearth.....	7 7½	to 7 17½	1.60 to 1.71
Channels, open-hearth...	7 12½	to 8 12½	1.66 to 1.87
Angles, open-hearth.....	7 7½	to 7 17½	1.60 to 1.71
Black sheets, No. 24 gage	9 15	to 10 0	2.12 to 2.17
Galvanized sheets, No. 24 gage .....	11 17½	to 12 5	2.57 to 2.60

### Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos. ....	£3 2½s. to £3 3½s.	\$15.21 to \$15.45
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Billets, Thomas.....	4 13	to 4 14	22.63 to 22.87
Wire rods, low C., No. 5 B.W.G. ....	6 2	to 6 4	29.69 to 30.19
Rails, light.....	6 0		29.20
Black sheets, No. 31 gage, Japanese .....	11 5	to 12 12	54.68 to 58.32
			Cents a Lb.
Steel bars, merchant....	5 7½		1.18
Steel bars, deformed....	5 6½	to 5 7½	1.17 to 1.18
Beams, Thomas, British standard .....	5 1	to 5 2½	1.11 to 1.14
Channels, Thomas, American sections.....	5 12	to 5 14	1.24 to 1.26
Angles, Thomas, 4-in. and larger, over ¾-in. thick .....	5 6		1.17
Angles, Thomas, 3-in....	5 7½		1.18
Hoop and strip steel over 6-in. base .....	5 15		1.27
Wire, plain, No. 8 gage..	6 9		1.41
Wire, barbed, 4-pt. No. 12 B.W.G. ....	10 10		2.28
Wire nails, base.....	6 12½		\$1.44 a keg

world could be controlled by a few companies. The Avesta Jernverks A. G. in Sweden, which recently booked the contract for stainless steel plates in the Assouan Dam, Egypt, and the Kawasaki Dock Yard Co., in Japan, are license holders under the Firth patents, and "Nirosta" being made in the United States is produced under licenses granted by the Krupp Nirosta Co. of New York.

According to reliable sources here, negotiations have been instituted between the German and British patentees, at which American producers were represented, with the object of reducing world competition for stainless steel business. While the negotiations are understood to have resulted in progress, no definite agreement was reached.

### Continental Car Builders Establish Cartel

HAMBURG, GERMANY, April 28.—Export allotments in the recently established Continental Railway Car Cartel have been fixed at 34.6 per cent for Belgium, 75 per cent of whose production goes for export; 28.8 per cent for Germany, 13.9 per cent for France, 10 per cent for Italy, 2.9 per cent for Hungary, 2.2 per cent for Austria, 6.9 per cent for Czechoslovakia and 0.7 per cent for Switzerland.

Contrary to original reports, which stated that all European car builders were members of the cartel, there are three outsiders in Germany, the Waggonbaufabrik Uerdingen A. G., Christoph & Unmarck and the Hawa A. G. These three companies have a combined export business of 1,500,000 m. to 2,000,000 m. annually, and do not intend to join the cartel at present. It is understood that a commission will be sent to the United States in an effort to reach an agreement with American car builders on business in South and Central American markets.

### Swedish Bearing Company Increased Exports

STOCKHOLM, SWEDEN, April 30.—The Swedish Ball Bearing Co. report for 1929 shows total sales of 66,000,000 krona (\$17,701,000), compared with 58,500,000 krona (\$15,689,000) in 1928. Production and selling cost is given as 47,000,000 krona (\$12,605,000) compared with 41,500,000 krona (\$10,970,300) in 1928. Net profit for 1929 was 21,400,000 krona (\$5,739,480) compared with 17,700,000 krona (\$4,747,140). The dividend continues unchanged at 12 per cent. While the number of employees at the end of 1929 was 7083, several hundred have been dismissed since then. The report mentions that the highest point of orders was reached in July, 1929, but the first quarter of 1930 showed larger exports than the corresponding quarter of the previous year.

## Cartel Steel Prices Shaded

### Continental Mills Circumvent Schedule by Refunds on Claims and Large Discounts for Cash

DUSSELDORF, GERMANY, April 26.—Transactions in steel products at less than the official quotations set by the Continental Steel Cartel continue, and investigation develops that several methods have been adopted by the mills to circumvent the efforts of the cartel to stabilize the price situation. While the cartel has announced several times that no sales are being made below the official minimum prices, the large steel merchants are quoting less and consequently must be obtaining their supplies from the mills at lower prices.

One of the known methods adopted by sellers is to accept an order for a substantial tonnage at the full cartel price, but with a previous understanding that the buyer will receive a check representing 2s. or 3s. a ton on the day the order is received. Another

method is to sell an exporter at the full cartel quotation, but allow 90 to 120 days for payment. Instead of using this credit, the exporter pays cash and receives a discount for cash equal to 6 per cent a year. A third arrangement for circumventing the cartel minimum prices is to charge the buyer the full official price, but with an understanding that he will enter a claim against the maker upon receipt of the material, on the basis of incorrect lengths, or unsatisfactory condition of the shipment. This usually brings a refund amounting to 2 or 3 per cent of the total price paid.

It is generally understood that the cartel is familiar with these methods, but is not yet in a position to enforce its price regulations, which would be likely to result in withdrawal from membership by many important mills.

### Steel Corporation's Orders Show Sharp Loss

Unfilled orders of the United States Steel Corporation on April 30 were 4,354,220 tons, showing a decline of 216,433 tons, or 4.8 per cent, from the total on March 31 and making the lowest backlog since that of Nov. 30. This was the first decrease registered since last August. The cumulative gain from Aug. 31 to March 31 was 912,442 tons.

Unfilled tonnage at the end of each month for the past two years follows:

	1930	1929	1928
April	4,354,220	4,427,763	3,872,133
March	4,570,653	4,410,718	4,335,206
February	4,479,748	4,144,341	4,398,189
January	4,468,710	4,109,487	4,275,947
December	.....	4,417,193	3,976,712
November	.....	4,125,345	3,673,000
October	.....	4,086,562	3,751,030
September	.....	3,902,581	3,698,368
August	.....	3,658,211	3,624,043
July	.....	4,088,177	3,570,927
June	.....	4,256,910	3,637,000
May	.....	4,304,167	3,416,822

The total on March 31 was the largest since Feb. 28, 1926. Except for one year ago the total of April 30 was the largest for that date since 1925.

### Russia Buys \$30,000,000 in Saw Mill Equipment

WASHINGTON, May 13.—Contracts aggregating \$30,000,000 for saw mill machinery have been let by the Soviet government to American firms, according to advices received from Portland, Ore., by the National Lumber Manufacturers' Association. The machinery is to be installed in 120 modern American saw mill plants in the Russian state forests.

M. A. Hanna Co., Cleveland, which recently formed a new subsidiary company known as the Hanna Coal Co., has transferred to that company all of the bituminous coal mining operations formerly conducted by the M. A. Hanna Co. through the Wheeling & Lake Erie Coal Mining Co., the Massillon Coal Mining Co. and the Jefferson Coal Co. Officers of the Hanna Coal Co. are: William Collins, president; R. L. Ireland, Jr., and P. C. Sprague, vice-presidents; W. C. Scott, secretary, and C. W. Brown, treasurer.

### Steel and Malleable Castings Made and Sold

	March, 1930	February, 1930	March, 1929
Commercial steel castings: (a)			
Production, total, net tons	113,915 (b)	107,897	115,163
do. railroad items	47,807	44,652	49,562
do. miscellaneous	66,108	63,245	65,601
do. three months	331,108	.....	306,144
New orders, total	122,844 (b)	114,727	130,826
do. railroad items	54,058	55,310	60,743
do. miscellaneous	68,786	59,417	70,093
do. three months	339,299	.....	370,788
Malleable iron castings: (a)			
Production, net tons	63,449	65,939	82,365
do. three months	190,768	.....	230,265
Shipments	64,908	59,954	81,063
do. three months	182,682	.....	229,287
Orders	61,374	61,668	86,744
do. three months	181,051	.....	241,507

(a) United States Department of Commerce. (b) Highest since last October.



# Machinery Markets and News of the Works

## Business Still Slow

### Machine Tool Orders Show No Improvement, Though Inquiries Gain in Some Districts

**M**ACHINE tool business shows no improvement, and it is doubtful whether the May volume will gain over that of April, which declined from the March total.

In some districts there is a fairly good volume of inquiries, but prospective buyers are still hesitant in placing orders, in view of the failure of general business to make any decided gains.

The backlogs of machine tool builders, which were quite large at the beginning of the year, have now been pretty well worked off, and some

plants are working almost wholly on current business. The result is that deliveries are easy on many types of tools. Longer than two or three weeks is unusual except in the case of machines built especially to the customer's specifications.

Current inquiries include one for about 15 tools for the Picatinny Arsenal, Dover, N. J., and several tools for the Delaware & Hudson Railroad, while prospective lists are under consideration by the Allis-Chalmers Mfg. Co., Milwaukee, and the Caterpillar Tractor Co., Peoria, Ill.

## New York

**N**EW YORK, May 13.—Inquiries for machine tools have gained slightly in the past week, but the volume of sales has not improved from the somewhat unsatisfactory conditions that prevailed in April. A prevalent view in the local trade is that sales will not show much improvement in the next few months, in view of the fact that manufacturers will be slow to put in new equipment until the trend of general business is more definitely upward, and positive indications of a favorable change may not become apparent until after the hot-weather period. The Picatinny Arsenal, Dover, N. J., closes bids on May 15 on a list of about 15 tools, and the Delaware & Hudson Railroad is taking prices on several machines. Otherwise, business is largely confined to single tools.

F. L. Smidth & Co., 225 Broadway, New York, manufacturers of cement mill machinery, parts, etc., have awarded general contract to Davis & Averill, Inc., 28 Fulton Street, Newark, for one-story addition to plant at Elizabeth, N. J., to cost close to \$35,000 with equipment.

Pechman Show Case & Store Fixture Co., Inc., 412 Lafayette Street, New York, has leased through its subsidiary, Pechman Holding Corporation, six-story building at 211-15 West Nineteenth Street, 50 x 101 ft., and will remodel for new plant.

Consolidated Gas Co., 4 Irving Place, New York, has authorized a fund of \$97,561,042 for extensions and improvements

in electric and gas plants and systems, including properties of its affiliated utilities, New York Edison Co., and Brooklyn Edison Co. Expansion will be carried out at Hell Gate station of first-noted subsidiary, including installation of equipment, as well as at plants on East River, and Hudson Avenue, Brooklyn. Last-noted station is operated by Brooklyn Edison Co., and installation will include two turbo-generators and auxiliary equipment to cost \$18,000,000. Consolidated company has taken out a permit for a three-story mechanical and electrical repair shop at 532-40 East Seventy-first Street, New York, to cost about \$350,000 with equipment. James S. Hunter, 30 East Fifty-eighth Street, is architect.

Board of Contract and Supply, City Hall, Albany, N. Y., is planning installation of manual training equipment in new three and four-story Arbor Hill junior high school to cost \$1,300,000, for which revised plans are being prepared by A. L. Delehanty, 121 North Pearl Street, architect.

J. J. Gloster & Co., 1440 Broadway, New York, architectural engineers, have filed plans for a six-story automobile service, repair and garage building, 75 x 100 ft., at 216-20 East Fifty-sixth Street, to cost \$175,000 with equipment.

West Side Sheet Metal Works, Inc., New York, has leased space in building at 239 West Sixtieth Street for new plant to manufacture automobile bodies and kindred sheet metal products.

New York Steam Corporation, 280 Madison Avenue, New York, operating central steam power plants, has authorized a fund of \$6,500,000 for extensions and improvements, including in-

stallation of additional machinery in a number of stations, distributing lines, etc. Company engineering department will be in charge.

Bakelite Corporation, 247 Park Avenue, New York, manufacturer of rubberized insulation products, has awarded contract for grading tract of 20 acres recently acquired at Bound Brook, N. J., and will soon make award for new plant to occupy large part of site, to cost over \$300,000 with equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

Marko Machine Co., Inc., 114 West Twenty-first Street, New York, has leased a floor in building at 549-51 West Fifty-second Street for new plant.

Richfield Oil Corporation of New York, Inc., 122 East Forty-second Street, plans rebuilding part of oil storage and distributing plant at Long Island City destroyed by fire May 7, with loss reported over \$150,000 including equipment.

Slee & Bryson, 16 Court Street, Brooklyn, architects, have taken out a permit for a six-story automobile service, repair and garage building, 64 x 100 ft., at 241-45 West Twenty-sixth Street, New York, to cost about \$300,000 with equipment.

Board of Education, New Paltz, N. Y., is considering installation of manual training equipment in new two-story high school to cost about \$170,000, for which plans will be drawn by Teller & Halverson, 280 Wall Street, Kingston, N. Y., architects.

Joseph Dixon Crucible Co., 163 Wayne Avenue, Jersey City, N. J., has awarded a general contract to William Robertson, Jr., 15 Exchange Place, for four-story and basement addition, 50 x 100 ft., to cost about \$100,000 with equipment. Contractor is architect and engineer for structure.

Alloys Foundry Corporation, Paterson, N. J., recently organized by Harry G. Lamker, formerly superintendent at local plant of Wright Aeronautical Corporation, and associates, has work under way on new plant at West Paterson, for manufacture of aluminum and alloy castings, to cost over \$75,000 with equipment. C. P. Brown, former president of Mitchell Oil Co., Paterson, is president.

Irvington Machine Co., 119 Coit Street, Irvington, N. J., has leased part of former plant of Rochester Button Co., Dickerson and Duryea Streets, Newark, for new unit for production of machinery for manufacture of razor blades, diamond cutting, etc., as well as department for production of camera parts for color photography.

John K. Sheehy, business manager, Public Schools, High School Building, State Street, Perth Amboy, N. J., will receive bids until June 5 for manual training supplies and other school equipment, as per lists on file.

Gulf Refining Co., Frick Building, Pittsburgh, has authorized reconstruction

of part of oil refinery, storage and distributing plant at Bayonne, N. J., destroyed by fire May 8, with loss of over \$1,000,000 including equipment, and which sum is estimated for rebuilding.

## Buffalo

**B**UFFALO, May 12.—Continuing its expansion program, Buffalo Foundry & Machine Co., 1543 Fillmore Avenue, Buffalo, has taken out a permit for a one-story addition to cost about \$50,000 with equipment.

Curtiss-Wright Co., Vulcan Street and Kenmore Avenue, Buffalo, is arranging to concentrate production of aircraft engines at plant of Wright Aeronautical Co., Paterson, N. J., a unit in organization, and will move certain equipment from Curtiss engine-manufacturing plant on Kall Street. It is understood that latter works will then be closed or used for a different branch of output. Production of military airplanes will be centered at Kenmore Avenue plant, which will be developed to maximum capacity for parts manufacture and assembling.

Niagara Sprayer & Chemical Co., Canal Road, Middleport, N. Y., manufacturing of sprayers and spraying equipment, etc., has plans for an addition to cost about \$25,000 with equipment. Unit will replace a recent fire loss.

Buffalo Produce Exchange, 162 Perry Street, Buffalo, in cooperation with Nickel Plate Railroad, Cleveland, is planning new produce terminal and farmers' market building, including cold storage plant, power house, storage and distributing units, with mechanical-handling equipment, automobile service, repair and garage building, and other structures to cost over \$5,000,000 with equipment.

Board of Education, Niagara Falls, N. Y., is planning installation of manual training department in new three-story junior high school in La Salle division, for which plans are being drawn. A fund of \$720,000 has been approved for project.

Henry A. Golvin, 78 Pasadena Place, Williamsville, N. Y., and associates have organized Beats-All Mfg. Co., Inc., with capital of \$50,000, to establish plant at Buffalo for manufacture of household appliances and equipment. A. Eugene Davenport, 24 Argyle Park, Buffalo, is also interested in company.

## New England

**B**OSTON, May 12.—The machine tool situation appears a little brighter. Three large machines valued at \$58,000 have been taken by a central Massachusetts plant, and numerous single tools were sold the past week. In addition, more inquiries for equipment were received by dealers last week than in the previous five weeks combined, and several pending inquiries from large manufacturing plants have shown more life. Sales of used tools are holding up well, although buying is largely of small and inexpensive machines. One recent sale includes two 14-in. tool-room lathes, a turret lathe and a hand-milling machine to a Massachusetts company.

In small tools, May sales to date have exceeded those for the first half of April by about 15 per cent.

Spartan Saw Works, Springfield, Mass., has closed bids on plant improvements to

## The Crane Market

**N**EW inquiry for overhead traveling cranes is limited. The Anglo-Chilean Consolidated Nitrate Corporation has made a slight revision in its specifications on 10 overhead cranes for export to Chile. Canadian Industries, Ltd., Montreal, has closed on two 8-ton, 4-motor, bucket handling cranes for Beloeil, Que., and Hamilton, Ont., with a Middle Western builder.

Locomotive crane inquiry is small and prospective buyers are slow to place orders. The Standard Oil Co. of New Jersey, has closed on a 25-ton locomotive crane with the Browning Crane Co. and the Central Railroad of New Jersey has also closed on a 25-ton locomotive crane. Pending business includes a crawl-tread crane for the United Electric Light & Power Co., New York, for the Hell Gate station and a list of cranes and shovels for the Amtorg Trading Corporation for export to Russia. The Atchison, Topeka & Santa Fe has placed a steam-operated locomotive pile driver with the Orton Crane & Shovel Co.

cost \$10,000 without equipment. Steel shelving and miscellaneous equipment are required.

City of Providence, R. I., will soon ask bids on a sewage disposal plant to cost \$100,000. Mechanical screens, grid chambers and possibly small shop equipment will be purchased.

L. G. Balfour Co., County Street, Attleboro, Mass., manufacturer of jewelry, plated ware, etc., has awarded general contract to O. M. Higgins, Park Street, for one- and three-story addition, to cost about \$60,000 with equipment.

Eastern Gas & Fuel Associates, 250 Stuart Street, Boston, operating artificial gas plants in different parts of State, is arranging for expansion in plants and system, to cost over \$5,000,000 with equipment.

L. F. Fales Machine Co., Walpole, Mass., has been formed with capital of 1250 shares of stock, no par value, to take over and expand company of same name with local mill for manufacture of paper-making machinery. Arthur C. McIntosh is president of new organization, and Stephen P. Cushman, treasurer.

New England Fuel & Transportation Co., Everett, Mass., has filed plans for additions to plant, including new coke crusher and accessories, gas producer plant, air blower unit, bins, etc., to cost \$150,000 with equipment. Company is a subsidiary of Massachusetts Gas Companies, Inc., Boston, which has arranged for bond issue of \$25,000,000, part of proceeds to be used for expansion and betterments in properties, including further expansion in New England Fuel plant noted, and acquisition of Charlestown Gas & Electric Co., Charlestown, and Old Colony Gas Co., in which expansion will be carried out.

F. W. Webster Co., 340 Congress Street, Boston, manufacturer of typewriter equipment and supplies, has asked bids on general contract for five-story plant unit, to cost over \$85,000 with equipment. Densmore, LeClear & Robbins, Park Square Building, are architects.

Hart Mfg. Co., Bartholomew Avenue, Hartford, Conn., manufacturer of electric switches, plugs, etc., has plans for a two-story addition, 25 x 35 ft., to cost about

\$25,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, are architects and engineers.

Plant of White Mountain Freezer Co., Nashua, N. H., was completely destroyed by fire May 4.

## South Atlantic

**B**ALTIMORE, May 12.—Western Electric Co., 195 Broadway, New York, manufacturer of telephone equipment, radio apparatus, cable, etc., has revised plans for additional six-story unit at new plant at River View Park, Baltimore, and will soon take bids on general contract, to cost more than \$1,500,000 with equipment.

Gulf Refining Co., Frick Building, Pittsburgh, has acquired property at East Abingdon, Va., and contemplates new oil storage and distributing plant, to cost about \$40,000 with equipment.

Weston & Brooker Co., Columbia, S. C., is planning construction of crushing plant for granite rock, with equipment for output of about 50 cars a day and storage capacity of 75,000 tons, including elevating, conveying and other mechanical equipment, to cost over \$75,000.

Board of District Commissioners, District Building, Washington, will receive bids until May 21 for following equipment for public schools: One speed lathe, one planer and jointer, one motor-driven band saw, two metal-working lathes, two tool grinders, and one motor-driven bench saw.

Odom Battery & Tire Co., 138 Spring Street, Spartanburg, S. C., has awarded general contract to J. M. Crawford & Son, Spartanburg, for one and two-story service and repair works, 92 x 140 ft., and will purchase air compressors, gas pumps and other equipment. J. Frank Collins, Andrews Building, is architect.

Appalachian Electric Power Co., Roanoke, Va., is considering extensions in hydroelectric generating plant at Reusens, Va., to cost over \$1,000,000, including additions in transmission system, and new water storage plant near Lynchburg, Va.

Board of District Commissioners, District Building, Washington, has plans for three-story business and industrial high school on Thirteenth Street, to cost over \$1,300,000 with equipment. A. L. Harris, address noted, is architect for board, and L. H. Reichelderfer, engineer.

Utilities Gas & Electric Co., 22 West Monroe Street, Chicago, operating gas and electric properties in North Carolina and other States, is considering early construction of artificial gas plants at Forest City, Spindale, N. C., and Gaffney, S. C., to cost over \$150,000 with equipment. Work on similar plant at Hendersonville, N. C., is under way, to be operated by Carolina Central Gas Co., Hendersonville, a subsidiary.

City Council, High Point, N. C., E. M. Knox, city manager, is asking bids until May 27 for elevated steel tank and tower, with capacity of 1,000,000 gal. and 65 ft. above top of foundations, for municipal water service. William C. Olsen, Inc., Raleigh, N. C., is consulting engineer.

Frederick Thomas, 726 East Thirty-third Street, Baltimore, architect, has asked bids on general contract for two and three-story automobile service, repair and garage building, 115 x 200 ft., to cost \$180,000 with equipment. H. F. Doeleman, Baltimore Trust Building, is engineer.



Board of Trustees, Morgan College, Arlington Avenue, Baltimore, has awarded general contract to Consolidated Engineering Co., 20 East Franklin Street, for three-story industrial science building at Morgan Park, to cost about \$125,000 with equipment. E. L. Tilton, 420 Lexington Avenue, New York, is architect.

Eastern Air Transport, Inc., Sperry Building, Manhattan Bridge Plaza, Brooklyn, N. Y., plans additional units at airport at Candler Field, Atlanta, Ga., including machine shop and addition to hangar, to cost over \$45,000 with equipment.

## Milwaukee

**M**ILWAUKEE, May 12.—So far this month machine tool orders have been only in moderate volume, but inquiry has been active. Locally, some large requirements are appearing. Extensive plant additions are being undertaken by the Allis-Chalmers Mfg. Co., A. O. Smith Corporation, Briggs & Stratton Corporation, Heil Co., Crucible Steel Casting Co. and several smaller industries. There is a fair call for used equipment, general supplies of which are less than a year ago.

Crucible Steel Casting Co., 1330 Fifteenth Avenue, Milwaukee, has placed general contract with Robert L. Reisinger & Co., 1995 Richards Street, for foundry addition, 100 x 135 ft., to cost about \$65,000 complete.

Joseph J. Plank & Co., 524 North Clark Street, Appleton, Wis., manufacturers of rollers for paper mill machinery and other devices, are beginning work on a shop addition costing about \$25,000 with equipment. Edward A. Wettengel, local architect, is in charge.

Meredith Brothers Co., 253 Washington Street, Milwaukee, has general contract for shop No. 7 at main works of Allis-Chalmers Mfg. Co., West Allis. It will be 145 x 304 ft., 50 to 60 ft. high, with craneways, tracks, etc., and is to be ready about Aug. 15. Cost is estimated at \$250,000.

Milwaukee Chair Co., 3022 Center Street, Milwaukee, manufacturer of commercial chairs exclusively, has plans for four new units costing about \$235,000, including equipment. Additions include machine shop extension, new boiler house, dry kilns and other departments. Line of products is being enlarged. Charles H. Eiff is vice-president and works manager.

Klug & Smith Co., 69 East Wisconsin Avenue, Milwaukee, has general contract to design and erect a two-story manufacturing addition, 175 x 180 ft., for the Heil Co., Twenty-sixth and Montana Avenues, manufacturer of steel dump bodies, tank bodies, hydraulic hoists and other motor truck equipment, storage tanks, stacks and other plate products. Investment will be about \$250,000. Julius P. Heil is president.

Common Council, South Milwaukee, Wis., closes bids May 19 for furnishing and installing one 4,000,000-gal. electric motor-driven centrifugal pumping unit with automatic reduced voltage starter and all necessary equipment, for municipal water plant. H. Daehling is city clerk.

Badger Tool & Engineering Co., Milwaukee, has been incorporated with capital stock of \$50,000 by Gustav Boerhofer, proprietor of Badger Machine Co., 2770

Hopkins Street. New associates are Walter E. Wahra and A. Brown.

General contract for designing and erecting six-story shop addition, 60 x 300 ft., for Briggs & Stratton Corporation, 1047 Thirteenth Street, Milwaukee, has been placed with Klug & Smith Co., 69 East Wisconsin Avenue, local. Work will cost about \$75,000. Charles L. Coughlin is vice-president and general manager. Company manufactures automobile locks, switches and window regulators, small gasoline engines and allied specialties.

Pabst Corporation, 917 Juneau Avenue, Milwaukee, is purchasing new machinery costing about \$250,000, including new filtering apparatus, additional equipment for drying plant and other divisions.

Illinois Steel Co., Chicago, has issued orders to J. D. Maurer, general superintendent of Bay View mills in Milwaukee, to recondition plant, idle for nearly a year, for part-capacity production of special work on indefinite schedule. In recent years plant has been operated only to handle overflow from Inland mills elsewhere.

Badger Tool Works, 1330 Clark Street, Racine, Wis., manufacturer of tools, dies, jigs and delicate machinery, is now under active management of Carl Stuhr, founder and formerly head of Stuhr & Nielson Machine Co., Racine, who has acquired a half interest. Machinery for replacement and some extension of capacity is being purchased.

Kimberly-Clark Corporation, Neenah, Wis., is awarding contracts for construction of beater room extension, 54 x 70 ft., costing about \$75,000 with equipment.

Kloman Erecting Co., Milwaukee, has been incorporated with \$30,000 capital stock to buy, sell and erect fabricated structural steel for buildings, bridges, etc. Office and shop are at 766 Fifty-eighth Street. Principals are Anton Kloman, Edward G. Kloman and Carl Johnson.

Manitowoc Ship Building Corporation, Manitowoc, Wis., has received contract from Consumers Co., Chicago, for two special steel hopper barges, each with capacity of 1500 tons of stone.

## Cleveland

**C**LEVELAND, May 12.—The machine tool market continues quiet in both sales and inquiries. One of the units of the General Motors Corporation purchased several special types of machines the past week and an Ohio steel plant bought two lathes against the list that has been pending for some time. Other orders were confined to single machines. The outlook for the remainder of the month is not very promising. Little business is in prospect for new plants and extensions and interest of buyers is confined largely to replacement machinery.

Patterson Foundry & Machine Co., East Liverpool, Ohio, manufacturer of pottery machinery, presses, etc., has plans for addition to foundry for production of steel castings, heretofore purchased from outside sources, and extensions in machine shop, to cost about \$100,000. Equipment will include an electric furnace, electric annealing ovens and accessories. R. L. Cawood is president.

Lambert Machine & Engineering Co., 1967 East Fifty-fifth Street, Cleveland, has taken over former plant of Shunk Plow Works, Bucyrus, Ohio, and will occupy for new plant, removing to that location in June and providing for in-

creased output. John Q. Shunk, owner of Bucyrus plant, has secured an interest in Lambert company.

Adamson Mfg. Co., East Clark Street, East Palestine, Ohio, manufacturer of steel tanks, is planning to rebuild part of plant destroyed by fire May 7, with loss close to \$50,000 including equipment.

Goodyear Tire & Rubber Co., Akron, Ohio, has arranged for increase in capital from 1,450,000 to 5,000,000 shares of stock, no par value, part of proceeds to be used for expansion. Company is arranging for commercial production of a specially designed tire for aircraft, including air-wheel unit complete, contract for hubs, brakes, etc., let to National Acme Co., Cleveland, to be produced under Goodyear patents.

National Milling Co., Toledo, Ohio, a subsidiary of National Biscuit Co., 85 Ninth Avenue, New York, has work under way on addition to flour mill to double present capacity, to cost over \$500,000 with mechanical-handling and other equipment.

R. W. Cornwall Mfg. Co. and Steel Blanking Co., Sandusky, Ohio, have been merged; new company retaining name of Steel Blanking Co. Both companies have been engaged in manufacture of sheet metal products and stampings.

## Chicago

**C**HICAGO, May 12.—The local machine tool market appears to be drifting. Fresh inquiries are few and dealers do not look for much improvement within the next few months. Orders from the railroads are spotty and inquiries scarce. The car shop list of the Milwaukee Road is the only railroad business now before the trade. It is stated that the Allis-Chalmers Mfg. Co., Milwaukee, is making a close study of machine tool needs, and that the Caterpillar Tractor Co., Peoria, Ill., may issue a list. A few items are still to be placed by the Nash Motors Co. for Milwaukee and Racine plants. Farm equipment manufacturers are buying fewer tools now than earlier in the year.

Majestic Household Utilities Corporation, manufacturer of electric refrigerators and refrigerating equipment, operated by Grigsby-Grunow Co., 5801 Dickens Avenue, Chicago, manufacturer of radio equipment, has awarded general contract to Austin Co., for one-story plant, 155 x 240 ft., on adjoining site, to cost about \$100,000 including equipment.

Aurora Metal Cabinet Co., 445 Woodlawn Avenue, Aurora, Ill., has taken out a permit for one-story addition, to cost about \$20,000 with equipment.

Edgar T. Ward & Son Co., 1455 West Thirty-seventh Street, Chicago, iron and steel, has revised plans for a one and two-story storage and distributing plant, to cost about \$120,000 with equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Northern Pacific Railway Co., Railroad Building, St. Paul, Minn., has plans for a machine repair shop, one story, at its locomotive and car shops, Glendive, Mont., to cost \$25,000 with equipment. O. M. Rognan, address noted, is company architect.

Interstate Power Co., Dubuque, Iowa, is planning an addition to steam-operated electric generating plant, to cost over \$400,000 with transmission lines. Company is operated by Utilities Power &

Light Corporation, 327 South La Salle Street, Chicago.

Interocean Sales Corporation, 2400 South Crawford Avenue, Chicago, is planning to rebuild part of oil storage and distributing plant destroyed by fire May 5, with loss over \$200,000, including tanks and equipment.

Deere & Co., Moline, Ill., manufacturers of agricultural implements and equipment, have begun construction of two one-story units at local foundry, to cost \$115,000 with equipment. Company will also carry out expansion at farm tractor manufacturing plant at Waterloo, Iowa, with erection of four one-story additions, largely for production of tractor wheels and parts, assembling, etc., to cost over \$300,000 with machinery.

Iowa Southern Utilities Co., Centerville, Iowa, has arranged for a bond issue of \$2,500,000, part of proceeds to be used for extensions and betterments in electric light and power plants, including transmission lines.

Keystone Steel & Wire Co., Peoria, Ill., has plans for a one-story warehouse with 100,000 sq. ft. of floor space, in Bartonville factory district. This is initial step in building program which may involve an expenditure of about \$1,000,000.

Marquette Tool & Mfg. Co., manufacturer of press attachments and riveting machines, has moved from 1900 North Kilbourne Avenue, to 6499 West Sixty-fifth Street, Chicago.

## Philadelphia

**P**HILADELPHIA, May 12.—Atlantic Refining Co., 260 South Broad Street, Philadelphia, has plans for additions to oil refinery in Point Breeze district, primarily for gasoline production, to cost close to \$2,000,000. Contract for part of equipment has been let to M. W. Kellogg Co., foot of Danforth Avenue, Jersey City, N. J.

Samuel Jackson's Sons, Philadelphia, manufacturer of railroad signal fuses and kindred products, has removed plant from 1112 South Fifteenth Street to new site near Bristol, Pa., and will increase capacity.

Morris Kardon Paper Co., 224 Pine Street, Philadelphia, manufacturer of paper boxes, containers, etc., has awarded general contract to Albert Laub, 812 West Wyoming Avenue, for addition to cost about \$100,000 with machinery. Robert N. Dippy, 1600 Walnut Street, is architect and engineer.

F. G. Vogt & Sons, Inc., Thirtieth and Race Streets, Philadelphia, meat packer, has awarded general contract to William Steele & Sons Co., Fifteenth and Cherry Streets, for four-story and basement plant, 112 x 370 ft., with one-story extension, 72 x 120 ft., for automobile repair and garage unit, to cost about \$1,000,000 with equipment. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

Dornier Co. of America, Inc., affiliated with General Motors Corporation, New York, recently organized by officials of that company and foreign Dornier interests, is negotiating for lease of about 50 acres of waterfront property at Hog Island, Philadelphia, site of proposed new airport and marine terminal of city. It is planned to begin work on flying boat manufacturing plant within 60 days, including group of buildings for parts production and assembling, to cost over \$2,500,000 with equipment. Louis C. Huck is vice-president and general manager of

Dornier company. Business Progress Association, Widener Building, R. Harland Horton, executive director, is interested in project for city.

Lit Brothers, department store, Eighth and Market Streets, Philadelphia, has filed plans for power plant, 80 x 127 ft., to cost about \$200,000 with machinery. Simon & Simon, Fidelity Building, are architects.

Universal Brass Works, Inc., 209 Vine Street, Philadelphia, has been organized to take over and expand company of same name, to manufacture brass brackets, tube arms and other brass goods. Saul Schwartz is treasurer of new company.

Harrisburg Gas Co., Harrisburg, Pa., is disposing of a bond issue of \$2,200,000, part of fund to be used for extensions in plants and system. Company is operated under direction of United Gas Improvement Co., 1401 Arch Street, Philadelphia.

W. F. Mosser & Son, Inc., Allentown, Pa., has been organized with capital of \$75,000 to take over and expand company of same name with local plant for manufacture of machine products, castings, etc. William F. Mosser, 2142 Chew Street, is treasurer. Others interested include Joseph F. and Charles F. Mosser, both of Allentown.

Barber Asphalt Co., Insurance Co. of North America Building, Philadelphia, has asked bids on general contract for two-story laboratory and engineering building, 50 x 120 ft., at Maurer, N. J., to cost about \$100,000 with equipment. Day & Zimmermann Engineering Co., 112 North Broad Street, Philadelphia, is architect and engineer.

Linear Packing & Rubber Co., Philadelphia, is occupying a new plant at State Road and Berks Street. Company manufactures piston and sheet packings, pump valves, molded rubber specialties, gaskets, etc.

## Pittsburgh

**P**ITTSBURGH, May 12.—Machinery business this month is not as active with some dealers as it was in April. New inquiry is also light. Large industrial lists are lacking and the railroads are not expected to do much buying before June. The Westinghouse Electric & Mfg. Co., East Pittsburgh, is in the market for a few tools and the American Bridge Co. has been making awards for its Ambridge plant. Otherwise specific information on business is lacking.

Cumberland Steel Co., Cumberland, Md., maker of ground shafting, expects to purchase several high production machines for cutting off bars, ranging from ½-in. to 4-in. in diameter. Machines as nearly automatic as possible are desired, cutting to allow end of bar to match ground surface of material.

St. Joseph Lead Co., New York, has purchased 200-acre site on Ohio River, three miles below Monaca, Pa., and will erect \$4,000,000 smelting plant. First unit will be begun immediately and placed in production late this year. Zinc and oxides of zinc will be produced by new process.

Quaker State Oil Refining Co., Oil City, Pa., has acquired oil refining plant of McKean County Refining Co., Farmers Valley, Pa., for branch refinery and plans increased output.

William E. Pelton, Canton, Pa., and associates have organized Portable Tool

Co., with capital of \$25,000, to establish a local plant for manufacture of portable tools and line of metal products. Alpheus E. Dann, Canton, and Daniel L. Miller, Monroeton, Pa., are interested in new company. Mr. Pelton will be treasurer.

City Council, Pittsburgh, is disposing of a bond issue of \$501,000, fund to be used for a joint city-county airport and aviation field, including hangars, repair shops and other units. Work is in charge of city engineering department.

Superior Mining Co., Eldersville, Pa., has authorized rebuilding of part of tipple at its local coal mine, recently destroyed by fire.

## Gulf States

**B**IRMINGHAM, May 12.—Pasotex Petroleum Co., El Paso, Tex., has work under way on additional unit at refinery, including installation of four new stills, battery of tanks and auxiliary equipment, to cost about \$1,000,000.

Texas Brass Mfg. Co., 1411-17 Elysian Street, Houston, Tex., is planning foundry equipment for brass and aluminum castings in local building, including electric furnaces, cranes, molding machines, etc. D. D. Dougherty is secretary.

Harrison County Poultry Association, Gulfport, Miss., is considering ice-manufacturing and cold storage plant to cost over \$45,000 with machinery.

Central Power & Light Co., San Antonio, Tex., is planning construction of pipe line from natural gas fields near Eagle Pass, Tex., to Del Rio, Tex., and vicinity, to cost about \$2,000,000 with compression stations and other facilities.

Board of Education, San Antonio, Tex., plans installation of manual training equipment in new senior high school to cost about \$1,000,000, for which bids will be asked on general contract in about 60 days. Phelps & Dewees, San Antonio, are architects.

Wackman Welded Ware Co., 1617 Silver Street, Houston, Tex., has begun construction of one-story addition, 60 x 100 ft., to cost more than \$30,000 with equipment.

Dallas Power & Light Co., Dallas, Tex., is arranging fund of \$750,000 for line expansion, including installation of underground and overhead high-tension system. Tract of 14 acres has been purchased as site for new power substation, to cost over \$80,000 with equipment.

Officials of J. M. Huber Petroleum Co., affiliated with Huber Carbon Co., Borger, Tex., recently formed with a capital of \$1,000,000, has acquired local oil properties of Barnum Oil Co., and C. B. Penney, including leases for about 4000 acres of such land, and will develop for increased output of refined oils and gasoline.

Houston Brick & Tile Co., Liberty Road, Houston, Tex., operating at former plant of Houston Brick Co., is arranging for expansion to cost about \$100,000, including presses, mechanical-handling and other equipment. James H. Edmonds is head.

Brookside-Pratt Mining Co., Brown-Marx Building, Birmingham, will carry out an expansion and improvements at coal-mining properties at Blossburg, Ala., including installation of haulage locomotive, tram cars, ventilating fans and other equipment. Similar betterments will be made at New River coal mine.



Board of Education, Gadsden, Ala., contemplates installation of manual training equipment in two-story addition to high school to cost \$115,000, for which plans will be drawn by Paul Hofferbert, Etowah Building, architect.

United Gas Co., Forth Worth, Tex., operating natural gas properties, has acquired natural gas system of Moran Gas Corporation, extending from White Point oilfields, Patrico County, to Taft, Portland, Aransas Pass, Ingleside and vicinity, with present output of about 4,500,000 cu. ft. daily, for price over \$1,000,000, and will operate in conjunction with other properties. Expansion is planned, including installation of additional pipe lines and compression stations.

Aransas Compress Co., Corpus Christi, Tex., has begun expansion program at cotton compress plant, including installation of presses and other mechanical equipment, to cost about \$250,000.

## Cincinnati

CINCINNATI, May 12.—There has been a slight increase in the volume of machine tool inquiries the past week. Small orders for lathes and cutter grinders continue fair. Manufacturers of planers indicate that although demand is slow, they still have enough orders on hand to maintain operations at the present short-time rate for a few months. Production, generally, continues at less than capacity, with one or two shops granting vacations to alleviate unemployment as much as possible.

Duriron Co., North Findlay Street, Dayton, Ohio, manufacturer of alloy castings, has plans for a one-story foundry, 64 x 80 ft., to cost about \$25,000 with equipment. Geyer & Neuffer, Ludlow Arcade Building, are architects.

Perry & Derrick Co., 908 Central Avenue, Cincinnati, manufacturer of paints, varnishes, etc., has awarded general contract to F. H. J. Lampe, Newport, Ky., for one- and two-story addition to factory at Dayton, Ky., to cost over \$45,000 with equipment. E. C. Landberg, Kentucky Building, Newport, is architect.

Delco Products Corporation, Dayton, Ohio, a subsidiary of General Motors Corporation, has purchased automotive division of Wahl Co., 1800 Roscoe Street, Chicago, covering shock absorbers and kindred specialties, and will manufacture in future at main works at Dayton. Wahl Co. will continue, as heretofore, to manufacture metal pencils, pens, etc.

City Council, Jackson, Tenn., has plans for extensions and improvements in municipal electric light and power plant, including installation of additional equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo. is engineer.

Richard B. Carran & Sons, Ludlow, Ky., manufacturers of brass and bronze castings, etc., have awarded general contract to Ferro Concrete Construction Co., Third and Elm Streets, Cincinnati, for one-story addition, 50 x 56 ft., to cost about \$32,000 with equipment.

Val Decker Packing Co., Piqua, Ohio, meat packer, has asked bids on general contract for three-story addition, 120 x 190 ft., to cost over \$100,000 with equipment. Anders & Reimers, Erie Building, Cleveland, are architects.

Kaye Ice Co., 624 Union Avenue, Memphis, Tenn., is planning one-story addi-

tion to ice-manufacturing plant on site recently acquired, to cost about \$40,000 with equipment.

Plant of Federal Brass & Mfg. Co., Marysville, Ohio, was completely destroyed by a fire May 5, which originated in foundry and gutted that and main building. Loss is about \$250,000. Company has not yet decided as to whether it will rebuild or locate elsewhere.

## St. Louis

ST. LOUIS, May 12.—Diamond T Motor Car Co., 4517 West Twenty-sixth Street, Chicago, manufacturer of motor trucks, has awarded general contract to L. Breitag & Son Construction Co., Railway Exchange Building, Kansas City, Mo., for one-story and basement factory branch, service, repair and sales building, 100 x 132 ft., at Kansas City, to cost about \$100,000 with equipment. E. O. Brostrom, Reliance Building, Kansas City, is architect.

Airport Committee of City Council, Forrest City, Ark., C. W. Norton, head, is completing plans for municipal airport, including hangars, repair shop, and other field units, to cost over \$65,000 with equipment.

Shell Petroleum Co., Shell Building, St. Louis, is planning new oil storage and distributing plant, with automobile service, repair and garage building at Racine, Wis., to cost over \$70,000 with equipment.

Armour & Co., Union Stock Yards, Chicago, are considering rebuilding part of five-story packing plant at St. Joseph, Mo., destroyed by fire May 8, with loss over \$100,000 including equipment.

Nek Era Motors, Inc., 400 North Main Street, St. Louis, and 17 East Forty-fifth Street, New York, has arranged with Kissel Motor Co., Hartford, Wis., for manufacture of front-drive automobiles under New Era patents, production to begin at Hartford plant early in summer. Regular production of Kissel cars will be continued as heretofore, with expansion for new line of output.

Officials of Phillips Petroleum Co., Bartlesville, Okla., have organized Phillips Pipe Line Co., a subsidiary, with capital of 1,000,000 shares of stock, no par value, to construct and operate pipe lines for oil and gasoline. Plans are under way for line from Texas Panhandle field to points in Kansas, about 900 miles, to cost about \$12,000,000 with booster stations, etc. Parent company is arranging for sale of 675,709 shares of capital stock, to total about \$21,722,700, part of proceeds to be used for expansion in refineries and systems. Arrangements have been made for construction of new gasoline refining plant at Judkins, Ector County, Tex., to cost over \$100,000 with equipment. Company has acquired Sloan Oil Co., Albia, Iowa; Newago Oil Co., Shawnee, Okla.; and Mount Vernon Oil Co., Mount Vernon, Ill., including storage and distributing plants, and will carry out extensions in different districts. Frank Phillips is president.

Officials of Barnsdall Corporation, Barnsdall, Okla., operating oil refineries, are forming a subsidiary to construct a pipe line from refineries at Barnsdall and Okmulgee, Okla., to Milwaukee and vicinity, about 800 miles, and which project has been authorized. Line will have capacity of 15,000 bbl. of gasoline per day, with 19 pumping and booster stations,

and storage and distributing plants located at every 50 to 75 miles, where gasoline will be drawn off for local service. Entire project will cost about \$8,000,000.

## Indiana

INDIANAPOLIS, May 12.—Union Starch & Refining Co., Columbus, has awarded general contract to S. M. Wilson & Co., Granite City, Ill., for four-story and basement unit, 70 x 130 ft., and two-story structure, 60 x 70 ft., at Granite City, to cost about \$100,000 with machinery. D. A. Bohlen & Son, Majestic Building, Indianapolis, are architects.

Board of Trustees, University of Notre Dame, South Bend, has plans for a new multi-story engineering building, to cost about \$450,000 with equipment.

Board of Sanitary Commissioners, room 103, City Hall, Indianapolis, is asking bids until May 27 for equipment for a dehydration unit for sanitary district, including motors for drier and stoker, induced draft fan, weighing lorry, gas and vapor ducts, storage tanks, spray system, conveying and processing equipment, etc. Plans and specifications at office of Charles H. Hurd, 518 North Delaware Street, consulting engineer.

Indiana General Service Co., Marion, operating electric light and power utilities, is planning new equipment storage and distributing plant, with meter and other mechanical departments, automobile service, repair and garage building, and automatic power substation on adjoining site, to cost about \$350,000 with equipment.

Property, assets and business of Vonnegut Machinery Co., 30 West South Street, Indianapolis, manufacturer of wood-working machinery and parts, are being offered at private sale, bids to be received on May 21, by Indiana Trust Co., Indianapolis, receiver, including new and used machines, wood-working machinery, compressors, transmission equipment, motors, hoists, etc.

Cummings Aviation Diesel Engine Corporation has been incorporated and will erect a plant at Columbus, Ind., to manufacture Diesel engines for airplanes and automobiles. Clessie L. Cummings, William G. Irvin and Frank N. Richman constitute board of directors.

Continental File Co., Anderson, has purchased property formerly occupied by Laurel Motor Co., and will move to new location and increase production.

## Detroit

DETROIT, May 12.—Copper District Power Co., Whitehall, has plans for a hydroelectric generating plant on Ontonagon River, Upper Peninsula district, near Victoria mining properties, including construction of six power dams and transmission system, to cost over \$1,000,000. Power will be furnished to Copper Range Mining Co., Calumet & Hecla Mining Co. and other interests in territory. Company has secured permission to issue \$2,000,000 in stock, part of fund to be used for project. Frank H. Speese, Whitehall, is one of heads of company. Holland, Ackerman & Holland, Ann Arbor, are consulting engineers.

Clarke Sanding Machine Co., 3315 Cortland Street, Chicago, manufacturer of vacuum portable sanding machines, portable electric saws, etc., has removed its plant to new building on McCracken Ave-

nue, Muskegon, totaling about 37,000 sq. ft. floor space, where it will concentrate production and install additional equipment.

Simrall Pipe Line Corporation, Muskegon, Mich., is planning construction of a pipe line from oil properties at Mount Pleasant to Muskegon and vicinity, about 100 miles, to cost over \$750,000 with pumping stations and other facilities.

Berkley Tool & Mfg. Co., Berkley, Mich., will operate at Ferndale in future, and concentrate production there. Increased capacity is planned. Company will change name to Ferndale Tool & Mfg. Co.

Public Utility Investment Co., Salina, Kan., has secured a gas franchise at Iron River, Mich., and is considering new artificial gas plant and system, to cost about \$100,000 with equipment.

Detroit Gray Iron Foundry Co., 6403 Wight Street, Detroit, is considering call for bids on general contract for one-story addition, 115 x 170 ft., to cost about \$70,000 with equipment. Mildner & Elsen, Hamm Building, are architects.

National Time & Signal Corporation, Detroit, 7751 Grand River Avenue, Detroit, recently organized with capital of \$100,000, will take over and consolidate Time Systems Co., with local plant at address noted; Chicago Signal Co., Chicago, and Lake Mfg. Co., San Francisco, all manufacturing signal and time devices, bells, horns, etc. It is proposed to concentrate production at Detroit, and expansion will be carried out in plant on Grand River Avenue to accommodate increase. R. S. Fulton, formerly vice-president of Time Systems Co., will be president of consolidated organization; W. P. Crockett of Chicago Signal Co., will be first vice-president, and D. F. Laird of Lake Mfg. Co., second vice-president.

## Pacific Coast

SAN FRANCISCO, May 8.—American Tractor Equipment Co., 5301 Horton Street, Oakland, Cal., has awarded general contract to Austin Co. of California, Inc., for one-story plant at Emeryville, Cal., to cost about \$30,000 with equipment. A crane runway will be installed.

Southern Sierras Power Co., Riverside, Cal., has secured permission to issue \$1,374,500 in bonds, part of fund to be used for extensions in power plants and system, including transmission lines. Company has plans for a new power substation at Barstow, Cal., to cost about \$50,000.

Baash-Ross Tool Co., 5512 South Boyle Avenue, Los Angeles, has secured all rights for manufacture of Vernon power presses and shears for use in sheet metal work, from Vernon Foundry Co., Hollydale, Cal., and will carry out production at local plant. Company has recently begun an expansion program and will provide additional facilities for press and shear output.

Coast Counties Gas & Electric Co., Santa Cruz, Cal., is arranging for a bond issue of \$4,000,000, of which about \$1,224,395 will be used for extensions and improvements in electric light and power and gas properties, including installation of equipment.

G. A. Applegarth, Spreckels Building, San Francisco, architect, has plans for a one-story vocational school at Camp Lillianthal, near Fairfax, Cal., for Boy Scouts of America, in connection with group of buildings for other service.

Crown-Zellerbach Co., operated by Zellerbach Corporation, 534 Battery Street, San Francisco, operating paper and pulp mills, has taken option on property at Port Townsend, Wash., as site for a paper bag manufacturing unit, to cost over \$400,000 with machinery.

Imperial Ice & Development Co., Coachella, Cal., has plans for a new ice-manufacturing and cold storage plant, to cost about \$100,000 with machinery.

Shell Oil Co., 200 Bush Street, San Francisco, is planning new oil refinery at Burnaby, adjoining Vancouver, B. C., to cost over \$2,000,000 with equipment. Project will be carried out by Shell Oil Co. of British Columbia, Ltd., an affiliated organization.

Pacific Clay Products Co., Chamber of Commerce Building, Los Angeles, manufacturer of heavy clay products, is planning extensions in sewer pipe manufacturing plant at Los Nietos, Cal., to cost over \$150,000 with equipment.

## Foreign

IN connection with automobile manufacturing works to be constructed by Autostroy, motor vehicle bureau of Soviet Russian Government, Moscow, at Nizhni-Novgorod, purchases of equipment are under way by Amtorg Trading Corporation, 261 Fifth Avenue, New York.

## New Trade Publications

**Ingot Molds.**—Vulcan Mold & Iron Co., Latrobe, Pa. A four-page leaflet, with blueprint attached, discusses "Moldkote" which is used to coat ingot molds. Some of the results of the use of this material by a number of steel makers are given.

**Nickel Steels.**—International Nickel Co., Inc., New York. An eight-page pamphlet, No. 15, in the nickel steel series is entitled, "Nickel-Chromium Steels for High-Temperature Service—Valves and Bolts." It is a reprint of an article written by V. T. Malcolm, metallurgical engineer, Chapman Valve & Mfg. Co., Indian Orchard, Mass. Illustrations and drawings, together with data as to chemical and physical properties, are included.

**Temperature Controllers.**—Wilson-Maeulen Co., 740 East 143rd Street, New York. A splendidly illustrated 12-page pamphlet entitled "Inspection Tour of Industrial Plants Showing Wilson-Maeulen Automatic Temperature Controllers in Use," describes some 30 such installations.

**Testing Machines.**—Southwark Foundry & Machine Co., Philadelphia. Four-page folder illustrating representative models of Southwark-Emery testing machines, ranging from a portable 40,000-lb. tension testing machine weighing only 175 lb. to heavy duty universal testing machines of 1,000,000 lb. capacity.

**Pickling Tank Control.**—Weaver Brothers Co., Adrian, Mich. Folder containing blue print of temperature controlling system for pickling tanks, whereby economies may be effected in metal, acid, steam, and time.

**Portable Tension Testing Machine.**—Southwark Foundry & Machine Co., Philadelphia. Leaflet describing machine developed primarily for testing

A group of Russian engineers and mechanics, headed by S. Z. Bondarchik, vice-president and acting president of Autostroy, is now at Detroit making a study of methods and equipment of River Rouge plant of Ford Motor Co. Plant in Russia will be used for parts production and assembling, and will cost close to \$5,000,000.

Ever-Ready Co. of England, Ltd., London, manufacturer of electrical products, automobile equipment, etc., has arranged for increase in capital from £750,000 (about \$3,750,000) to £1,000,000 (about \$5,000,000), part of fund to be used for expansion.

Italo-Argentine Electric Co., Buenos Aires, Argentina, has arranged for sale of 50,000 shares of capital stock, part of proceeds to be used for extensions and improvements in power plants and transmission lines. Company has work under way on new steam-operated electric generating plant scheduled for completion in 1932. It is known officially as Compania Italo-Argentina de Electricidad Sociedad Anonima.

Lautaro Nitrate Co., Ltd., operated by Anglo-Chilean Consolidated Nitrate Corporation, 120 Broadway, New York, is placing contracts for equipment for new plant in Chile for production of nitrate of soda and affiliated specialties, and will soon give additional orders. Plant will be located at Pedro de Valdivia, and is scheduled for completion in 1932. It will cost about \$4,000,000.

welded joints, cut from structures and tested in the field. The entire machine is contained in a 6¼-in. cylinder, 28 in. long.

**Thermal Analysis Equipment.**—R. Y. Ferner Co., Investment Building, Washington. Sixteen-page pamphlet describes equipment for studying changes in volume of solids with changing heat, and recording the results either visually, mechanically or photographically, as devised by Prof. Pierre Chevenard of France.

**Carburizing Retorts.**—Driver-Harris Co., Harrison, N. J. A one-page illustrated leaflet describes a vertical carburizing retort weighing 3905 lb. cast of nichrome. It was tested at 100 lb. pressure and found gas-tight. The leaflet states that there are hundreds of patterns available similar to those weighing from 1 oz. and upward to 4000 lb.

**Testing Machines.**—Southwark Foundry & Machine Co., Philadelphia. A four-page illustrated leaflet describes several types of large testing machines of the Southwark-Emery design, having capacities running up to 3,000,000 lb. They cover machines for testing materials from thin sheets up to large steel products.

**Hardness Values.**—International Nickel Co., Inc., New York. A four-page leaflet, No. 16, in a series on nickel steels is entitled, "Approximate Relations Between Brinell, Rockwell and Shore Hardnesses and the Tensile Strengths of Structural Alloy Steels."

**Steel Castings.**—Lebanon Steel Foundry, Lebanon, Pa. A four-page illustrated leaflet, entitled "Tons of Material Swing High and Safe on Lebanon Steel Castings," shows the application of electric steel castings, as made by this foundry, to aerial and other conveying equipment.



## The Week's News Quickly Told

## Current Events That Bear on the Course of Business

**TRADE** has been stimulated by warm weather and postponed requirements, but wholesale and jobbing sales are still mainly to supply temporary wants . . . A good sign is increased bank clearings in interior cities removed from the influence of speculative activities.

**STOCK** prices moved irregularly. Brokers' loans were reduced \$200,000,000.

**SUGAR** is at the lowest price in 70 years. Stocks on hand in United States and Cuba are one-sixth greater than a year ago, with prospective bumper crops in Porto Rico and Philippines . . . All groups of commodities except food products decline. Prices of metals and textiles are especially weak.

**TEXTILE** manufacturing in New England is indicated by census returns for New Bedford, Fall River and Lowell, which show losses of 5 to 12 per cent in population.

**HIGHWAY** contracts in the first quarter, at \$114,000,000, more than double the figure for the corresponding period last year . . . Unemployment is mitigated, owing to the commencement of such outside work . . . Employment in New York decreased gradually from 1926 to 1928, but reversed the trend in July, 1928. A 10-per cent decline since last October more than wiped out the improvement of the preceding 15 months. During the last 30 days only one of eleven major industries, namely ceramics, reported an increase in employment . . . Austria has permitted 15,000 workmen to contract for three years' work in France, on condition that they do no work on frontier fortifications.

**RADIO** merchandise carried over from last year by Radio Corporation of America has been sold, according to President Sarnoff. Receiving sets and tubes represent 80 per cent of the Corporation's business . . . Wireless transmission of photographs is used to send weather maps to dirigibles . . . Recent developments in radio and flying instruments and in weather services will enable regular operation of passenger aircraft, and provide safe navigation and landings in fog, said Colonel Lindbergh.

**SHIPPING** now under construction in the United States totals 277,000 tons of ocean-going or Lake vessels . . . United Fruit Co. contracts for six 10,000-ton ships, fully refrigerated, for trade in the equatorial regions, to cost about \$20,000,000 . . . American built turbo-electric liner Santa Clara, of the Grace Line, sets a record of 4 days, 18 hours, New York to Panama, as a part of a 16-day schedule to Valparaiso . . . Earnings of the Atlantic, Gulf & West Indies Steamship Lines at \$2,900,000, are four times as great as in 1928, but the British-owned White Star Line cleared \$200,000 less than in 1928 (about \$1,625,000).

**NORTH SEA** canal, leading to Amsterdam, Holland, has been deepened to 41 ft., and a 1312 by 164-ft. lock installed, suitable for a 60,000-ton liner . . . Ship-to-shore aircraft mail, a regular service, leaves the steamships Bremen and Europa about 300 miles from Land's End, England, with English mail to Southampton and European mail to Amsterdam.

**BELGIAN** diamond cutters' syndicate, which voted a 50-per cent curtailment, has expelled 35 members for violation of the agreement, and

will organize patrols to enforce the 15-day month . . . B. M. Baruch proposes a "supreme court of business" to consider problems requiring business cooperation, and to license such actions as are now hampered by the Sherman and Clayton acts, under "constructive, non-political sanction of the Government." . . . Wisconsin Supreme Court holds that a manufacturer may not contract with a jobber to be his exclusive selling agent in any territory, as such is in effect a "monopoly."

**SIGNALS** operating in engine cabs have replaced wayside semaphores and lights on a single-track line of the Central Railroad of New Jersey . . . Delaware & Hudson Co., following the lead of three other important railroads, has withdrawn its own merger plan from consideration by the Interstate Commerce Commission . . . Turksib Railroad, a 1700-mile line, has been completed in four years, 18 months ahead of schedule, thanks to a liberal use of excavating machinery. Its most important traffic will be grain from Siberia to Turkestan, enabling much land in the latter area to be devoted to exportable cotton and fruits . . . American engineers are supervising a north and south railroad in the Caucasus, 430 miles long.

**OIL** and gasoline prices are advancing, since the reduction in crude and refinery runs has caused some drafts on stored products . . . Important additions to pipe lines distributing natural gas from the Gulf States will be in the form of 800 miles of short lines connecting the Shreveport-Atlanta trunk with neighboring communities, and a long line from Texas Panhandle southwesterly into the copper camps of Arizona and Sonora.

### COMING MEETINGS

#### May

**American Foundrymen's Association.** May 12 to 16. Convention and exposition, Public Auditorium, Cleveland. C. E. Hoyt, 222 West Adams Street, Chicago, secretary.

**National Industrial Conference Board.** May 15. Annual meeting, Hotel Astor, New York. Magnus W. Alexander, 247 Park Avenue, New York, president.

**National Hardware Association of the United States.** May 16 and 17. Annual meeting of the metal branch, Clifton House, Niagara Falls, Ontario, Canada. George A. Fernley, 505 Arch Street, Philadelphia, secretary.

**American Society of Mechanical Engineers.** May 19 to 21. Fourth annual aeronautic meeting, Dayton, Ohio. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

**American Refractories Institute.** May 19 and 20. Annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Dorothy A. Texter, 2218 Oliver Building, Pittsburgh, secretary.

**American Institute of Mining and Metallurgical Engineers.** May 20 and 21. Open-hearth committee meeting, Statler Hotel, Buffalo. L. F. Reinartz, American Rolling Mill Co., Middletown, Ohio, chairman.

**American Steel and Heavy Hardware Association.** May 20 to 22. Twenty-first annual convention, Edgewater Beach Hotel, Chicago. B. R. Sackett, 505 Arch Street, Philadelphia, secretary-treasurer.

**National Foreign Trade Council.** May 21 to 23. Annual meeting, Hotel Biltmore, Los Angeles. O. K. Davis, India House, New York, secretary.

**Society of Automotive Engineers.** May 26 to 29. Summer meeting, French Lick Springs Hotel, French Lick

Springs, Ind. C. F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

**American Electrochemical Society.** May 29 to 31. Spring meeting, Coronado Hotel, St. Louis. Colin G. Fink, Columbia University, New York, secretary.

Inland Steel Co., Chicago, has issued a booklet and two folders on its sheet steel products. The booklet, "Inland Open Hearth Sheet Steel Products," describes each of the many grades of Inland steel sheets, gives standard extras and differentials, tables of tolerances and weights, and includes a section describing trade customs and practices. One folder describes the company's new coated sheet steel and the other includes new data on copper alloy steel sheets.

